Alcoa is a world leader in the production and management of primary aluminum, fabricated aluminum and alumina combined, through its active and growing participation in all major aspects of the industry. The Company employs 63,000 people in 31 countries. Alcoa Canada employs 4,235 employees (3,603 in Quebec) and runs four plants with an annual production capacity of over one million metric tons of ingots, castings, billets and aluminum rods: Baie-Comeau, Bécancour (held at 25% by Rio-Tinto Alcan) and Deschambault smelters, as well as the Bécancour Rod Plant. The company also runs 13 transformation facilities in Canada and owns a minority share of a hydropower facility in Canada.

Alcoa’s perspective on biodiversity

Impacts on biodiversity

Alcoa operations can affect biodiversity in several ways:

- Alcoa mining activities for bauxite ore can have local impacts on biodiversity through disturbed land and habitat in and around the mine pit, including by its connecting roads and conveyors, disruption of stream flows and benthos, surface and ground water use, discharge of wastewater and solid waste disposal.
- At production sites, biodiversity can also be affected by air emissions of materials such as fluorides, sulphur dioxide and particulates. Also, industrial operations in refineries to produce alumina from bauxite ore generate solid waste, called red muds.
- The use of hydroelectric facilities to generate power can also have effects on biodiversity. Alcoa has completed detailed studies of the effects of hydroelectric projects in southeastern United States and is committed to managing and operating all hydro facilities to minimize impacts on biodiversity.

Alcoa’s biodiversity management policy

Biodiversity conservation is a key consideration for Alcoa in the planning for new or expanded operations, divestment of assets no longer operated, and the day-to-day management of owned lands.

One of the objectives for Alcoa mining activities is to minimize the footprint of disturbed land by implementing a program of progressive land rehabilitation.

Alcoa upholds a commitment not to explore or mine in World Heritage Sites and is committed to avoiding legally designated protected areas where strict nature conservation is the management objective.

Also, control and monitoring programs of emissions at all major sources of the smelters have been implemented to minimize the impacts on the environment. In particular, since 2003 the Baie-Comeau site has been investing in real-time monitoring devices of air emissions that led to a significant decrease in fluorides and particulates.

Prior to constructing new facilities or expanding existing ones, Alcoa engages external consultants to conduct an environmental, social and health impact assessment to determine what effects the project has on the environment.

Measures to minimize adverse impacts on ecologically significant ecosystems or species are identified and incorporated into the detailed design of the planned facilities. Particular attention is given to the conservation of rare, endangered, or threatened species.

One method Alcoa uses to gather biological information for the area of a planned Alcoa facility is the Rapid Assessment Program (RAP) from Conservation International (CI). Recent RAPs conducted for proposed Alcoa projects include the following:

- **Guinea**: Refinery in the Boké prefecture;
- **Ghana**: Bauxite mining in the Atewa forest;
- **Suriname**: Bauxite mining in the Lely, Nassau, and Brownsberg areas.

By working with independent non-governmental organizations and a strong technical team, Alcoa helps ensure an open and objective assessment of the environmental impact of a proposed project while also building trust with the local community.

One of Alcoa challenges is to measure its performance on biodiversity management. Unlike emissions and discharges or the use of resources, it is difficult to find a biodiversity metric that can be aggregated across diverse businesses.
To this end, Alcoa plans to initiate a requirement for all of its locations with substantive land holdings to develop biodiversity management plans. These plans will:

- Identify the biodiversity values of the land, including sensitive habitats and presence of threatened species, in context with surrounding land;
- Identify potential impacts, both positive and negative;
- Develop a management plan based on the hierarchy of biodiversity mitigation measures—avoid, minimize, rectify, compensate;
- Set and report performance against site-specific targets.

During 2008, Alcoa commenced the rollout of biodiversity management plans, seeking advice from stakeholders and consulting with site personnel.

The Ecosystem Service Review conducted at the Baie-Comeau site will serve as a basis for the site’s biodiversity management plan.

**Ecosystem services review of an aluminum smelter in a biosphere reserve**

**Rationale**

Alcoa’s Baie-Comeau smelter, created in 1957 was expanded on four different occasions between 1957 and 1991 and is currently producing 440,000 tonnes a year of primary aluminum.

The smelter is located in the southern part of the Manicouagan-Uapishka World Biosphere Reserve designated in 2007, which covers an area of 54,800 km² in the northern part of the St. Laurent estuary. It includes eight different types of ecosystems including boreal forest, arctic tundra, salt pan and the St Laurent estuary, and is habitat for many different species of fauna (25 fishes, 45 mammals, 295 birds and 16 amphibians and reptiles). It is also home of the Innu community of Pessamit.

Alcoa’s smelter is one of the 7 industrial activities operating in the area of cooperation of the biosphere reserve covering 43,315 km² (79%) of the reserve. Impacts and dependence related to aluminum ore alumina production, as well as electricity production from Alcoa’s suppliers have not been included.

During 2009, Alcoa commenced the Ecosystem Service Review (ESR) conducted at the Baie-Comeau site will serve as a basis for the site’s biodiversity management plan.

1. Select the scope and the boundaries within which to conduct the impact and dependence assessment on ecosystems. The scope retained by Alcoa for this project is the Baie-Comeau modernized smelter in its 2015 configuration. Impacts and dependence related to aluminum ore alumina production, as well as electricity production from Alcoa’s suppliers have not been included.

2. Identify priority ecosystems services by evaluating the degree of the Baie-Comeau facility dependence and impact on 24 ecosystem services. Some of those services, such as water and air are already covered in the EIA; others need additional information collection and analysis to assess the level of dependence and impact (e.g., pollination).
3. **Analyze trends in priority ecosystem services.** Assessment of the level of dependence and impact. Seven ecosystem services with a high level of dependence or impact were identified: freshwater, air quality regulation, global climate regulation, water purification and waste treatment, recreation and ecotourism and the ethical value of ecosystem services. The latter include in particular seven sensitive species (Atlantic Cod, American Eel, Barrow’s Goldeneye, Fin Whale, Blue whale, Pygmy shrew, Rock vole), and wild foods. The level of dependence and impact varies among them, with air and global climate regulation being the most important ones.

4. **Identify business risks and opportunities** that may arise due to the trends in priority ecosystem services. From the above list of priority ecosystem services, Alcoa has made a focus on global climate regulation as a top priority both because of the level of impact of GHG emissions generated by the aluminum production process, and the level of dependence the site has on climate change consequences. In particular, increased frequency and intensity of extreme weather incidents could modify the erosion rate and affect the water level in the dam supplying hydropower to the site.

5. **Develop strategies.** Strategies have been and will be implemented both at the existing plant and within the modernization project to incorporate the findings of the ESR. For the modernization project, the environment criterion has been retained to prioritize and decide upon different options, based on the results of the EIA and ESR. In particular:
   - Industrial equipment and the future site layout have been chosen to reduce the noise impact;
   - The future site footprint has been maintained to limit the size of land impacted and one scenario was excluded because its water management system was impacting a second catchment basin;
   - In order to limit waste transportation (earth waste from construction and solid waste from dismantling operations) a recycle program has been implemented to use material on the site during construction. Also, the site invested in a process to treat contaminated land in-situ, in order to limit transportation (the nearest facility being located at approx. 400 km from the site);
   - Process GHG emissions will be reduced thanks to the new technology implemented. The use of larger boats to transport alumina will maintain the level of GHG emissions due to transportation despite the increased freight, thus reducing the ratio teq CO2 / tonnes alumina transported.
   - The surveillance of biodiversity which Alcoa is already carrying out on pollutants-sensitive plants in the site’s surrounding, will be strengthened to include the monitoring of sensitive species in cooperation with scientists and expert consultants.

To Alcoa, the ESR approach and the EIA method, when combined, allow a wider and more systemic understanding of the modernized facility impacts and dependence on ecosystem services. EIA focuses on business activity impacts on the environment whereas ESR enlarges the scope of analysis to business activity dependences on ecosystem services, therefore minimizing the risk of omitting significant issues.

**Stakeholders and roles**

Alcoa has consulted the World Research Institute team regarding the different steps of the project to share experience and get a better understand of the methodology.

The Manicouagan-Uapishka World Biosphere Reserve management has been informed of the project and invited to participate in meetings with the WRI. The second phase of the pilot project will involve closer collaboration of the Alcoa project team with the Biosphere Reserve.
Communication

Within the framework for the project, a first public meeting was held in June 2009 to present both the EIA and the ESR to a Comité d’échange et d’information for the modernization project of the Baie-Comeau facility. The committee includes representatives from municipalities, environmental groups, and development institutions.

A second meeting took place in October to present the modernization project, focusing on the development of the project and the prioritization of the concerns and comments the group had. It included a visit to the facilities and an open-house session for the local community. When available, results of the EIA and the ESR will also be posted on a dedicated website (www.alcoaprojets.ca).

Based on the comments received during the meetings, the creation of two stakeholder sub-committees was initiated: one on the optimization of the economic local return (beginning December 2009) and the second on the environmental impact, to be started in April 2010.

Outcomes

Benefits

Economic

The ESR approach allows Alcoa to identify and mitigate business risks related to ecosystem services, in particular in the context of a biosphere reserve where such ecosystem services may be protected or limited.

Because of the use of the Manicouagan-Uapishka World Biosphere Reserve resources by other projects or activities (e.g., water), it is all the more crucial for Alcoa to ensure that natural resources and ecosystem services are sustainably managed.

Biodiversity

The analysis combining EIA and ESR helps systematize the collection of information on wilderness areas and therefore generates better knowledge.

A specific biodiversity action plan will be integrated within the sustainability framework of the Baie-Comeau site in application of Alcoa policy. The EIA and ESR helped identifying sensitive species on the site and also a lack of updated information regarding the current status of those species, as some data were more than 50 years old. The site plans to increase biodiversity monitoring to have a better knowledge of the populations of sensitive species on the site.

Lessons learned

The first application of the ESR methodology by Alcoa raised some questions for which guidance from the World Resource Institute was needed, in particular:

- the determination of the scope and the boundaries of the industrial system to be reviewed. Integrating aspects related to the supply chain in the ESR would generate additional collection of data.
- the correct understanding of some ecosystem service categories, in particular the regulating services where the interrelatedness with other ecosystem services (e.g., climate and erosion) made it difficult to discriminate impact and dependence.

Also, further guidance in the determination of impacts on biodiversity conservation with the ESR methodology would be needed to ensure that the review takes into account the company’s operations dependence and impact on wilderness in the premises of the site.

Changes in company’s practices

In a second phase of the project, the objective is to develop an approach integrating both EIA and ESR methodology adapted to the Company’s processes and deployed on Alcoa major projects.

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