ZOFNASS PROGRAM
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BIOGAS FROM WASTE, BUEN AYRE PLANT
ARGENTINA

Figure 1: Central Buen Ayre
Sources: Central Buen Ayre team

Valeria Fantozzi prepared this case study under the supervision of Cristina Contreras ENV-SP and Judith Rodriguez ENV-SP as part of the Harvard-Zofnass program directed by Dr. Andreas Georgoulias by initiative of IDB for the purposes of research and education.

Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective project design or implementation.

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EXECUTIVE SUMMARY

The Central Buen Ayre S.A. project, located in Buenos Aires, Argentina, is a thermal plant that generates power through the collection, extraction, and treatment of biogas coming from a landfill. This plant is the first of its kind to operate in Argentina, and aims to displace the use of nonrenewable sources of energy in the national grid. The team of Central Buen Ayre operates under Tecsan Ingenieria Ambiental S.A., a company created in 2009 designed to generate and distribute electrical energy. The project originated through a public bidding process from Energía Argentina Sociedad Anónima (ENARSA), the government entity in charge of energy generation in Argentina. They worked in collaboration with Coordinación Ecológica Área Metropolitana Sociedad del Estado (CEAMSE), the government company in charge of managing waste and solid residues from the urban region of Buenos Aires. Central Buen Ayre designed a proposal for renewable energy generation in a module located in the already existing North Environmental Complex III, a site previously owned by the Argentine military.[1] The module, IIIc, is one of three modules already operating on site. The company that won the bidding, Tecsan Ingenieria Ambiental S.A., is a subsidiary of Benito Roggio Ambiental.[2] The lifespan of the project is 14 years, and includes the collection, extraction, treatment and valorization of Biogas through generation and injection of energy to the National Electrical Power Grid. The power plant, with a maximum power of 11.8 MW,[3] is expected to achieve a total reduction of carbon emissions of 6,043,349 t CO_2e.[4]

The power plant is deliberately located in an isolated area because it handles methane gas, a highly explosive fluid. Its location in a previously used military facility means there are few species of flora and fauna, and surrounding communities are distant. Nonetheless, the project team, in conjunction with the consulting company Ingeniería Laboral y Ambiental (ILA), performed an in-depth environmental survey of the natural landscape to ensure proper impact management. They concluded that flora, fauna, and human settlements would not be significantly impacted by the construction and operation of the plant. Studies of noise and light pollution showed in detail how the project's construction was well within desired levels according to national regulations. In addition, the project of Central Buen Ayre produced a positive economic impact by creating a total of 161 new jobs during the construction phase and 15 permanent jobs during the operation phase. Central Buen Ayre was not directly in charge of the hiring process, and instead relied on Finning Argentina S.A., the local representative of the

[1] Central Buen Ayre, "Presentación Asociaciones y Cooperativas de Cartoneros," Argentina, 2011, 13.
[2] Ingeniería Laboral y Ambiental S.A., División Ingeniería Ambiental, "3. Estudio de impacto ambiental, central de generación de energía a partir de biogás Central Buen Ayre," Córdoba, Argentina, 2011, 70–79.
[3] Ingeniería Laboral y Ambiental S.A., División Ingeniería Ambiental, "4. Descripción técnica: estudio de impacto ambiental, central de generación de energía a partir de biogás Central Buen Ayre," Córdoba, Argentina, 2011, 24–25.
[4] United Nations, "Clean Development Mechanism: Project Design Document Form," 2006, 9.

Caterpillar company, for the construction phase of the plant and the process of hiring. Caterpillar was in charge of setting up the equipment and machinery for the energy generation phase, in which the project is currently operating. In addition, they have developed detailed monitoring guidelines to ensure the appropriate handling of its products.

The energy generating plant from biogas is the first of its kind in Argentina; therefore design strategies for possible unprecedented problems had to be created. The project team developed a detailed analysis of impacts in both the construction and operation phase, and concluded that possible accidents related to the handling of biogas would produce the highest negative impact during the operation phase. For this reason, they designed a new protocol for emergencies, following the guidelines of ENARSA.

There is evidence of a strong commitment to develop Central Buen Ayre within a system focused on sustainable integration. Its policies are aligned with ISO and OSHA regulations to assess quality management, management of environmental systems and security systems, and management of health in the working environment. The project also obtained approval under the Clean Development Mechanism (CDM) of the Kyoto Protocol of the United Nations. Taking them as a baseline, the project meets national and municipal Argentine regulatory requirements and laws from a sustainability and an environmental point of view.

Furthermore, the project connects with existing infrastructure to create meaningful improvements in their internal performance. Infrastructure integration is achieved in two central aspects of the power plant: in the lechate treatment facility, by using an existing plant located in one of the modules of the complex, and in the underground medium voltage line, by connecting the energy produced to an existing power station. In addition, in order to optimize the processes and increase efficient performance, the project team developed a systematic plan for the constant monitoring and maintenance of machinery operating in the power plant, linked to the person responsible for the job. This shows an adequate amount of resources allocated to plan maintenance in the long term. The project team of Central Buen Ayre developed a clear procurement policy matrix with performance specifications that applied to key companies in charge of hiring workers and other suppliers. Even though the project team outsourced the hiring process, they ensured that the companies contracted, such as Finning Argentina S.A., met sustainable practices. For this reason, the project team developed an evaluation form targeted to key companies. In addition, the project team took advantage of its location within the North Environmental Complex III to use the reclamation facility's Mechanical Biological Treatment Plant to recycle between 25% and 50% of its materials.

Central Buen Ayre did an excellent job in its energy management, showing a strong

commitment to reducing nonrenewable energy use. In the initial stages of the project, the power plant sustained internal energy needs with power produced from the six generators of the plant, of which the resulting net energy was injected into the national grid. However, in 2014 the project team bought a smaller additional GE Jenbacher 250 kW generator for the specific objective of fulfilling internal energy needs. Therefore, a higher percentage of power produced can now be injected into the national grid, displacing the use of fossil fuels. In this way, the project generates a net positive amount of renewable energy.

In terms of land and water management, the North Module IIIc is part of the North Environmental Complex, so most large-scale systems are managed by the complex as a whole. Taking advantage of the project's design as a module of a larger complex, the project team decided to use the compost produced by the composting plant located in the North Environmental Complex as fertilizer. The compost uses raw material from municipal pruning to create an organic fertilizer.

The project team of Central Buen Ayre, with input from the consulting company ILA, determined that no net negative impact would affect local communities, flora, and fauna. However, there is still room for improvement related to the potential social benefits the plant of Central Buen Ayre could have had. Because the project team was not directly involved in the hiring process for construction and operation, they were unable to enforce policies to benefit job creation for local communities, and instead most of the jobs were given to experts brought from outside the area of influence. If the hiring process for the plant had been led by the project team, they could have benefited local communities further by hiring people from the immediate surroundings. This would have increased human capital and thus produced more long-term benefits. Furthermore, even though there were benefits from the modular design of the plant as part of a larger complex, it also meant that systems were not tailored to the specifics of the energy generating plant. In order to specifically address the problems related to the project, the project team could have adapted the general guidelines designed by the complex as a whole to meet their own needs. Still, the project of Central Buen Ayre did an excellent job in the reduction of carbon emissions, by capturing the gas generated by the waste, which otherwise will be released to the atmosphere.

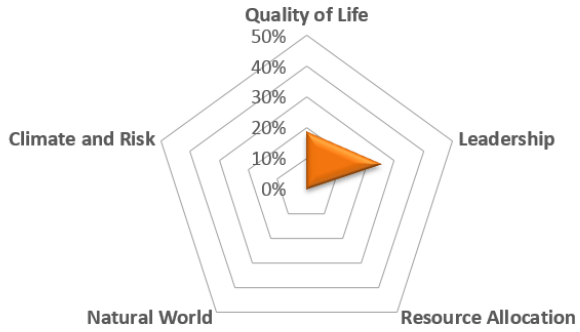

Figure 2: People & Leadership award Summary of results

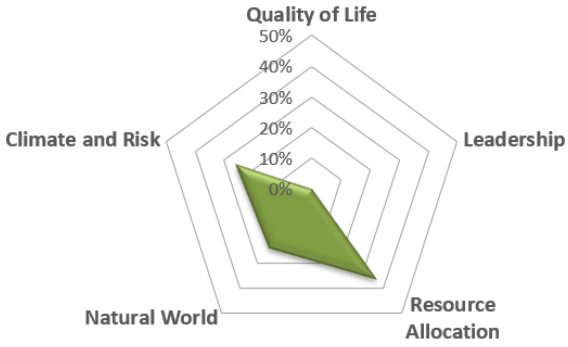

Figure 3: Climate & Environment award Summary of results

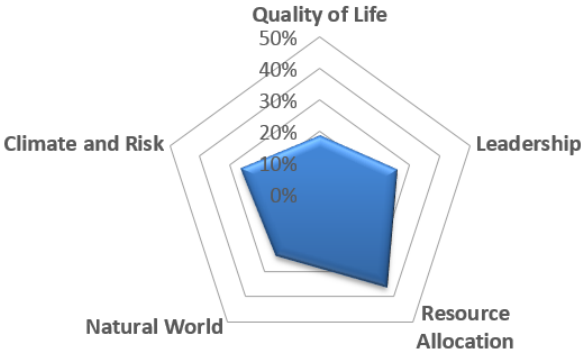

Figure 4: Infrastructure 360 award Summary of results