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NORTE GRANDE ELECTRICITY TRANSMISSION PROGRAM

Northeast Section (NEA)

Argentina

An application of the Envision™ methodology for infrastructure sustainability

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Inter-American Development Bank
1300 New York Avenue, N.W.
Washington, D.C. 20577
www.iadb.org

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For more information please contact: Tomás Serebrisky (tserebrisky@iadb.org) or Graham Watkins (gwatkins@iadb.org).

Cover picture: Extra-high-tension transmission line (Source: Courtesy of Alberto Levy, October 2015)

EXECUTIVE SUMMARY

This evaluation applies the Envision™ Rating System on the Norte Grande Electricity Transmission Program (NGETP) in Argentina, focusing in the Northeast Section (NEA). Envision is a unique system that assesses the sustainability of infrastructure projects, which awards efforts to pursue sustainable values going beyond standards practices. The following assessment demonstrates the achievements of the project and aspects to improve, considering a broad range of criterion. The assessment is organized in 5 categories: Quality of life; Leadership; Resource Allocation; Natural World; and Climate and Risk.

The principal objective of the NGETP is to fulfill the growing energy demands of northern Argentina while improving the reliability and accessibility of electrical power for the region. The project will reduce electricity costs and stimulate economic growth toward the minimization of poverty and economic disparities between the northern region and other, more developed areas of the country.

The project extends across multiple provinces; as such it will enhance the security of the national grid and expand the transmission network between the northeast and northwest regions. Additionally, the project will strategically position the country for electricity transmission integration opportunities between the Atlantic and Pacific regions of South America, specifically with Brazil, Paraguay, and Chile.

The total cost of the project is approximately US $725 million, of which US $580 (80%) was provided via an Inter-American Development Bank loan and US $145 was financed by the Argentine government.[1] The IDB loan received approval in 2006; construction of the main transmission lines was completed in 2011, and corresponding substations in 2010.[2] Regional transmission lines are currently under construction. The project is designed for a lifespan of 50 years; often, however, the life of similar projects can extend beyond 50 years.

The NGETP was executed through concession contracts and comprised approximately 1,200 km of extra-high-tension lines (500 kV), associated electrical substations, and corresponding lower-tension lines (132kV to 400 kV) for regional distribution.[3] Comprehensive environmental impact studies were realized in accordance with Argentine regulations that steered concessionaire construction, operation, and maintenance contracts and evaluated both environmental and social impacts. In terms of construction and operation, the project is divided into two sections of approximately 600 km: the Northeast (NEA) and the Northwest (NOA) sections. Because of its successful and timely implementation, the NEA section is the subject of this evaluation.

The NGETP developed and executed a substantial reforestation program that surpasses Argentine regulatory policies for electricity transmission projects. The total area affected by NEA vegetation clearing during the construction period was approximately 2,750 Ha; of this, approximately 90% was located on private property that had been previously disturbed by agricultural activities and 10% in densely forested areas.[4] To compensate the loss of vegetation, the project significantly increased the area of prime habitat through the reforestation program, planting approximately 600,000 endemic-species trees. It is estimated that through the reforestation program approximately 13,800,000 tons of CO_2 are annually sequestered.[5]

The reforestation program employed successful communication and coordination plans with regional

[1] IDB. Resumen del proyecto: Argentina Programa de Transmisión Eléctrica del Norte Grande (AR-L1021): Propuesta de préstamo (n.d.), 1.
[2] Alberto Levy (IDB Team Leader), Juan Carlos Paéz Zamora (IDB Environmental Specialist), Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, 9 September 2015.
[3] Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. EIA. *Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV.* (March 2006), 7.
[4] Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. *Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV*, (March 2006), 170-173.
[5] Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015).

communities, landholders, municipalities, and local authorities. Nurseries were established for tree donations to local municipalities, and to reforest areas directly affected by the clearing of vegetation and debris on both private and public lands. The program supports research efforts on native species, including their regenerative capacity and potential uses. The program's flexibility has been demonstrated through modifications to the initial program in subsequent locations in order to align with new requests from local agricultural operations and smallholder farmers in specific areas. As such, the revised project design focused on the enhancement of existing public spaces and restoration of vegetation for the benefit of the general population. Additional economic stimulus stemmed from new job creation through the reforestation program; local community members were trained in reforestation and continue to be employed in tree nurseries. A regional workshop for government representatives, teachers, and students was held on the value of native forests, as well as other municipal partnership and community outreach programs.

The project avoided land of high ecological value and prime habitat as well as maintaining and restoring areas both directly and indirectly affected through the reforestation program. The use of native, noninvasive species helps preserve biodiversity, enhance soil infiltration capacity, mitigate flooding, and eliminate the need for pesticides and fertilizers. Although the specific intent of the reforestation program was not to mitigate project-associated greenhouse gas emissions and ambient emissions, the plantings were successful in doing so through carbon sequestration and air quality improvement.

The NEA aligns with regional community goals and is considered to positively impact the quality of life of affected communities in the provinces of Formosa, Chaco, and Santiago del Estero. The program is regarded as augmenting and supporting socioeconomic development, poverty alleviation, and job creation through expanded business and employment opportunities as a result of accessibility to more reliable, efficient, and less costly regional electricity.

Regional livability is enhanced through community programs that include donations to schools and municipalities, improvements on existing roadways, and upgrades to other regional infrastructure systems. Discouraging unplanned urban sprawl and minimizing congestion near urban centers and transportation hubs were determined to be important, and the project design chose to utilize and upgrade existing roads instead of creating new ones. The project also improved community wayfinding in populated areas and neighborhoods to address public health and safety, security, traffic circulation, and emergency responses. Additionally, measures were applied to preserve local character and enhance public spaces through transmission line placement and tree planting programs in municipalities.

Proactive stakeholder engagement processes were systematically applied in the planning, construction, and operation phases to evaluate the project's ongoing environmental and social impacts. Early-stage public consultation sessions with property owners, farmers, and other members of a local Mennonite community determined that a reevaluation of design features related to line and reforestation locations was necessary. Modifications to project plans were implemented that included location layout and financial reimbursements; all met with community and key stakeholder approval.

The project team has exhibited successful collaborative efforts, methods, and teamwork throughout all project phases, involving planners, management, contractors, community stakeholders, and regulatory bodies in the quest for sustainable performance. Multiple constituents comprise the team, and the project has clearly exemplified team integration. The project has also been successful in integrating other elements of community infrastructure at both local and regional scales. Long-term planning is demonstrated through the project's detailed and delegated monitoring and maintenance plans.

Provisions for effective stakeholder identification, engagement, and involvement include communication programs for relationship building and key stakeholder involvement in decision-making processes. The public input practice was implemented in initial project

planning, construction, and operational phases, leading to design modifications and enhanced community involvement. Additionally, responsibilities for sustainable performance concerns are delegated, primarily based on the Environmental Impact Assessment and through subsequent monitoring programs. The project teams have demonstrated assessment and prioritization of environmental, social, and economic aspects in the transmission program, and have developed plans and processes to manage the project accordingly.

The project demonstrated a systematic and responsive approach to minimizing its impacts on the natural world within the project scope. Transmission line placement, management design, and continual monitoring programs were aimed at the preservation of prime habitat and avoidance of high-ecological-value areas, including wetland and aquatic environments. Alternative line locations were also evaluated in order to minimize erosion and prevent landslides. Floodplain infiltration and water quality are included in the monitoring programs. Emergency response programs were structured to avoid unnecessary and damaging exposure and risks to the project and the environment through line placement modifications and restoration of directly and indirectly affected areas. Project impacts on prime farmland were a relevant consideration, because a large percentage of the transmission lines pass through agricultural areas. As such, design modifications were made for their preservation through public consultations with the agricultural communities.

Surface and groundwater contamination was addressed in the project's Environmental Impact Assessment and operational policies. Management plans and corrective procedures for accidental spillages and leaks are stipulated in concession contracts. In addition, the project has restored 100% of soils disturbed during construction in site location areas, and the organic quality of the topsoil, aeration, and infiltration were improved through the practice of chipping cleared vegetation and reincorporating it into site locations.

Practices to minimize emissions can contribute to both short-term and long-term risk management improvements and create resiliency in infrastructure projects. Policies, management plans, and monitoring programs were employed in the project to reduce and mitigate air pollutant emissions, per Argentine regulations. Movement of equipment during the construction period generated the largest emissions of pollutants. Contractor contracts address the containment and monitoring of released oils, grease, hydrocarbons, and dust through equipment certification and access road spraying. Additionally, the NEA reforestation program is expected to improve ambient air quality and mitigate threats of extreme climatic changes. Studies and analyses on environmental standards and safety procedures in wetlands, aquatic environments, and floodplains as well as fire hazards in relation to removed vegetation were conducted. Project management plans and operator policies provide processes and response plans to minimize adverse environmental effects.

The project has demonstrated significant levels of sustainable infrastructure practices throughout its planning, construction, and implementation phases. However, opportunities for the development of practices and policies that further enhance the inclusion of vulnerable groups, sustainable practices for resources utilized, consideration of the natural environment, and climate and risk factors would improve the project's sustainability on a broader level.

Consideration of materials, energy, and water used during the construction and operational phases of the project that account for sustainable procurement practices, end-of-life disposal, net embodied energy, and minimized net impact on water sources show opportunities for improvement. The benefits of the project for regional economic development, improvement in the quality of life of affected communities, and extensive reforestation could be paired with further attention to resource allocation opportunities to account for minimizing finite resource use throughout the life of the project.

The project utilized between 70% to 100% of regionally sourced material, thus minimizing adverse environmental impacts from material transportation such as greenhouse gas emissions and other pollutants, at the same time as it supported the

regional economy.[6] Additionally, the project implemented measures to recycle and reuse suitable materials.[7] Further attention to minimizing natural resource use would minimize waste, embodied carbon emissions, and environmental degradation. The project demonstrates a comprehensive waste management plan for waste diversion from landfills, specifically in regards organic material of which 100% was retained on site and reincorporated into the soil.[8] Opportunities exist to assess future reuse of excavated inorganic materials and operational material use to improve waste percentages.

Close monitoring systems for energy use and the application of additional design features to account for alternative energy sources that exceed industry standards for operations and maintenance activities, such as on-site generation at the substations or alternative fuel sources for equipment, would assist in the reduction of the project's overall energy use from fossil fuels. NEA implements sound guidelines for monthly water quality monitoring, but opportunities exist for additional attention to water use and freshwater availability metrics toward improving quality and availability. Water's vulnerability to climatic extremes can affect a project's and surrounding community's consumption demands. Analyses of possible reductions of potable water consumption through systematic practices toward the utilization of gray water, recycled water, and stormwater, specifically in the construction phase, are an opportunity for improvement.

Carbon assessment analyses that include materials utilized in the supply chain, along with a comprehensive climate impact assessment and adaptation plans in construction and operating activities, would improve the project's resiliency and preparedness for long-term adaptability and responses. Furthermore, vulnerability assessments will assist affected communities in preparation for minimizing associated climate extremes and risk hazards.

[6] "Régimen de Compras del Estado Nacional y Concesionarios de Servicios Públicos, Compre Trabajo Argentino," *Ministerio de Economía y Finanzas Públicas Argentina*. Accessed 16 October 2015, http://www.mecon.gov.ar/digesto/leyes/ley25551.htm. Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with Zofnass Team, (27 January 2016).
[7] Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with Zofnass Team, (27 January 2016).
[8] Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (8 October 2015).

1 PROJECT DESCRIPTION AND LOCATION

The Norte Grande Electricity Transmission Program (NGETP) located in northern Argentina entails the construction of a 1,220 km extra-high-tension electrical transmission line[9], which will connect the northwestern (NOA) and northeastern (NEA) regions of the country. The program also includes complementary infrastructure, such as the construction of three associated power distribution substations, the expansion of four existing power distribution substations, and the construction of corresponding high- and medium-tension regional transmission lines. The main transmission line extends through six provinces, including Formosa, Chaco, Santiago del Estero, Salta, Jujuy, and Tucumán.[10]

The program is owned by the Republic of Argentina. When construction is complete, it will be operated and maintained by the private sector under a concession model. The execution of the program is overseen by the Secretary of Energy, through the Federal Administrative Committee of the Electric Transport Trust Fund (CAF). The main regulatory authority of the energy sector is the National Electricity Entity, which is responsible at the federal level for the approval of transportation and energy projects, as well as oversight of their technical and environmental aspects.[11]

In the Argentine transmission system, the Company for Electricity Transmission at High Voltage (Transener) is the private concessionaire responsible for operating and maintaining lines of exclusively extra high voltage. Transener operates 9,356 km of 500 kV lines. The Company for Electricity Transmission for Distribution in the Argentine Northwest (Transnoa) and its counterpart in the Argentine Northeast (Transnea) are both private concessionaires for lines under 400 kV down to 132 kV in their respective regions. The concessionaires are not required to make investments in the expansion of the transmission system. Fees basically cover the costs of operation and maintenance.[12] In view of this operation model, the design for the construction project divided the transmission line into two sections of approximately 600 km each, to be built by two separate contractors for NEA and NOA, respectively, in order to expedite construction.

In terms of funding, the total cost of the program is estimated to be approximately US $725 million, 80% of which was secured through a US $580 million loan from the Inter-American Development Bank (IDB). The project's counterpart, the Argentinean government, financed the remaining US $145 million.[13] The loan was approved and the contract signed in 2006, and the construction of the main transmission line and corresponding substations was completed in August of 2011 and November of 2010, respectively. The regional transmission lines are currently under construction.[14]

This program is embedded within a larger national plan named the Plan Federal de Transporte de Energía Eléctrica, as well as the regional development plan Programa de Desarrollo e Integración del Norte Grande. The general objectives are to guarantee coverage of the growing electricity demand, enhance the security of the Argentinean national grid, and help to mitigate poverty by stimulating economic growth to reduce the

[9] Línea de Extra Alta Tensión (LEAT)
[10] Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía, "Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV," March 2006, 7.
[11] IDB, "Informe de Gestión Ambiental y Social, ESMR: Programa de Interconexión Eléctrica del Norte Grande," March 2006, 14.
[12] IDB, "Program de Transmisión Eléctrica del Norte Grande (AR-L1021): Propuesta de préstamo (N/D)," 2.
[13] IDB, "Resumen del proyecto: Argentina Programa de Transmisión Eléctrica del Norte Grande (AR-L1021): Propuesta de préstamo (N/D)," 1.
[14] Alberto Levy (IDB Team Leader), Juan Carlos Paéz Zamora (IDB Environmental Specialist), and Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, September 9, 2015.

development gap between the north of the country and other regions. In addition, the plan seeks to promote energy exchange between the northeast and northwest regions, consolidate and expand transmission networks to strengthen security and feasibility, and support the development of freight centers in multiple provinces.

Additionally, it is anticipated that the program will strategically position the country with regard to future integration between the Atlantic and Pacific regions of South America, namely with Brazil, Paraguay and Chile. This program is part of a very important project for the country, the integration of the Argentine Interconnection System, the overall electric grid that serves most of the country.[15] Upon completion, the program aims to fill regional energy demands, reduce electricity costs, and improve the quality, reliability, and accessibility of existing electrical distribution systems for local communities and local industries.[16]

For the main transmission line, several alternatives were studied in order to minimize the social and environmental impacts of the project. The considerations included avoiding the cutting of native trees and vegetation of the tropical montane forest; avoiding disruptions to the terrain that could lead to landslides; utilizing available roads and other means of accessibility to facilitate the work; avoiding urban areas so as not to compromise their future development through the visual impact of the line; avoiding hills and steep gradients; avoiding areas with touristic or archaeological value; giving preference to river crossings at points with existing bridges; avoiding airports; and avoiding industrial facilities and infrastructure associated with the transportation of hydrocarbons in order to prevent interference and pollution.[17]

The economic, physical, and cultural characteristics of the NEA and NOA sections vary, and therefore implementation and management strategies varied by section.[18] This division allowed for an expedited construction process, and potential impacts were assessed in both the direct and indirect areas of influence. Different environmental management systems were developed for the construction and implementation of the two sections, in order to minimize adverse environmental impacts. The programs that were implemented included the reforestation of endemic and native flora species in affected areas, as well as the utilization of existing access roads and other public infrastructure services such as bridges and railways. Operator licensees for Transener, Transnea, and Transnoa were required to employ the ISO 9000, ISO 14000 and IRAM environmental management standards.[19]

Social impacts were considered throughout each of the program's phases, including planning, construction, and implementation. The program helps to mitigate poverty and improve the regional economic and social development by providing access to electricity at reduced costs. Regional direct employment opportunities were increased through the NGETP, primarily during construction. Additional indirect economic and social impacts were observed through the increased demand for support services in nearby communities. Localized impacts for affected property owners and farmers were also considered, and when reasonable and necessary, landholders were financially compensated for adverse impacts such as agricultural land degradation or deforestation.

For the purpose of the sustainable evaluation of the NGETP, the following analysis focuses on the northeast section (NEA), which includes the provinces of Formosa, Chaco, and Santiago del Estero. The execution of this section of the project was faster than for the northwest section (NOA), and presented a stronger environmental management system.[20]

[15] Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. *Evaluación de Impacto Ambiental Interconexión NEA-NOA 500 kV* (March 2006), 14.
[16] IDB. *Informe de Supervisión Ambiental Argentina: Transmisión Eléctrica para el Norte Grande* (23 April 2012), 2.
[17] IDB. Informe de Gestión Ambiental y Social, ESMR: Programa de Interconexión Eléctrica del Norte Grande (March 2006), 5-6.
[18] Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. *Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV*, (March 2006), 71.
[19] IDB. *Informe de Gestión Ambiental y Social, ESMR, Programa de Interconexión Eléctrica del Norte Grande* (March 2006), 7, 13, 20.
[20] Alberto Levy (IDB Team Leader), Juan Carlos Paéz Zamora (IDB Environmental Specialist), Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, 9 September 2015.

2 APPLICATION OF THE ENVISION RATING SYSTEM

Norte Grande Electricity Transmission Program – Northeast Section (NEA)

The Envision™ system is a set of guidelines that aid in optimizing the sustainability of an infrastructure project during the planning and preliminary design phases, as well as a means to quantify the relative sustainability of the project. In this case study, the infrastructure to be assessed is the Norte Grande Electricity Transmission Program – Northeast Section (NEA) in Argentina.

Envision consists of 60[21] credits grouped into five categories: Quality of Life, Leadership, Resource Allocation, Natural World, and Climate and Risk. Each credit pertains to a specific indicator of sustainability such as reducing energy use, preserving natural habitat, or reducing greenhouse gas emissions. Those credits are rated on a five-point scale referred to as a "level of achievement": "improved," "enhanced," "superior," "conserving," and "restorative." Evaluation criteria are provided to determine whether the qualifications for each level of achievement have been met for a particular credit. In each of the five categories there is a special credit called "Innovate or exceed credit requirements." This is an opportunity to reward exceptional performance that applies innovative methods within the subjects that Envision evaluates.

The criteria for the levels of achievement vary from credit to credit, but generally an "improved" level of achievement is awarded for performance that slightly exceeds regulatory requirements. "Enhanced" and "superior" levels indicate additional gradual improvement, while "conserving" often indicates performance that achieves a net-zero or neutral impact. "Restorative" is the highest level and is typically reserved for projects that produce an overall net positive impact. The Envision system weighs the relative value of each credit and level of achievement by assigning points. Credit criteria are documented in the Envision Guidance Manual, which is available to the public on the ISI[22] and Zofnass[23] Program websites.

3 QUALITY OF LIFE CATEGORY

Envision's first category, Quality of Life, pertains to potential project impacts on surrounding communities and their well-being. More specifically, it distinguishes infrastructure projects that are in line with community goals, clearly established as parts of existing community networks, and consider long-term community benefits and aspirations. Quality of Life incorporates guidance related to community capacity building and promotes infrastructure users and local members as important stakeholders in the decision-making process. The category is divided into four subcategories: Purpose, Well-being, Community, and Vulnerable Groups.

[21] Plus 3 new credits of the Vulnerable Groups subcategory
[22] www.sustainableinfrastructure.org
[23] www.zofnass.org

Purpose

The Purpose subcategory evaluates the project's impact in the communities affected by it. This includes aspects such as: improvements in quality of life, growth, and development, the development of local skills, and capacities for a long-term sustainable development. The NGETP Northeast Section was rated as having a solid performance. However, with regard to the development of local skills and capacities, the project could have incorporated more of a community focus by implementing training programs to enhance long-term compatibility.

The NGETP Northeast Section aims to provide pervasive improvement in the quality of life for the citizens of the Norte Grande region in Argentina through reliable and efficient electricity transmission systems at lower cost for end users. Moreover, socioeconomic development and poverty mitigation will be supported by increased accessibility to electricity for local communities, individual citizens, and businesses alike – reducing socioeconomic dissimilarities between Norte Grande and more developed regions of the country. It is anticipated that improved electricity infrastructure in the region will attract new industry opportunities, strengthen regional development, and improve regional quality of life.

The documentation demonstrates that key community stakeholders were actively engaged in the phases of program design, construction, and implementation. Modifications were made to the design of the transmission lines. In addition to compensations awarded, the location of the reforestation program shows how unmediated impact can adversely affect specific landowners. Public consultation programs were applied in all phases of the project in accordance with Argentine law. In addition, specific programs are considered to enhance the quality of life in respective communities, including donations to local schools and municipalities, as well as improvement in existing roads and other regional infrastructure.

Direct local employment opportunities are created as an outcome of infrastructural construction. In addition, indirect employment opportunities developed as a result of a demand for required services for an increasing regional population during construction phases. The reforestation program and relational local nurseries contributed to building new spaces for local workers. However, specific capacity-building initiatives for marginalized and disadvantaged citizens and for unskilled workers leave room for implementation.

Well-being

The Well-being subcategory's goal is to improve community and worker comfort, health, and mobility as a result of project design, construction, and implementation. Main subjects to evaluate for this purpose include: public health and safety, nuisances due to noise, vibration, and light pollution, livability, and community mobility, including alternative modes of transportation and wayfinding. The NGETP achieved a good level of performance associated with community well-being due to actions that addressed noise and vibration, mobility and access, and safety and wayfinding. There is opportunity for improvement primarily in minimizing light pollution and encouraging alternative modes of transportation.

Special health and safety measures related to the use of new technologies, materials, or methodologies were not taken into account as part of the program, because it utilized conventional construction techniques and materials. The project team did identify potential risks to public and worker health and safety. For these, preventive actions were implemented according to regulatory requirements, receiving the approval of the Argentine governing bodies.

Broad studies concerning noise and vibration, consistent with Argentine and international guidelines, were performed by qualified personnel. Subjects thus addressed included audible noise from high- and lower-tension lines as well as machinery operation for worker safety and community well-being. Additionally, electrical lines and substations were evaluated for radio interference and electromagnetic and electric fields. All systems are monitored.

No actions were implemented to prevent excessive night lighting. Light spillage represents a waste of energy, disturbs nocturnal animals, and interferes with wilderness parks and preserves and other light-sensitive habitats. Therefore, it is recommended to carry out an overall lighting needs assessment.

Community livability was considered through utilization of and upgrades to existing roads in order to minimize traffic congestion as a result of increased machinery during construction and to mitigate unplanned urban sprawl. Further documentation on improvement of overall and long-term community access and mobility would be beneficial for the program in order to illustrate improvements in community livability beyond the construction phase.

Detailed design plans were developed and implemented by the project team to address site accessibility, safety, and wayfinding in and around the constructed works. Project workers and community residents were considered through the use of intuitive and well-detailed signage and general diligence. Additional documentation on the project's use of environmental and cultural resources to improve overall community access and safety would be advantageous in further studies.

Community

The Community subcategory examines the project's impact on the preservation of historic and cultural resources, its effects on views and local character, and the enhancement of public spaces in the affected communities; it considers aspects such as program design, community stakeholder feedback, and the improvement of community livability as applied to these topics.

The NGETP Northeast Section complied with Argentine law in its assessment and monitoring of existing and potential sensitive regions for the preservation of historical and cultural resources. NEA is an area of low probability for the discovery of archaeological and paleontological artifacts; nonetheless, the project team fulfilled its obligation in addressing potential findings through a systematic and well-monitored program. The project clearly addressed the preservation of cultural resources (including those that are historical, or relate to religious beliefs or traditions and customs) through the modifications to the project mutually agreed upon with the Mennonite community in Santiago del Estero. Additional programs would be desirable that work with cultural preservationists on project upgrades in alignment with stakeholders' needs.

Electrical transmission lines, towers, and substations create visual impacts on any landscape. The project team's objective was to preserve views to the extent possible, and to provide clear documentation on the methodologies used to minimize visual effects. Most of the affected landscapes were rural; in areas of greater sensitivity, the project employed design plans and reforestation activities to minimize adverse impacts. Further programs to identify local high-value landscapes would contribute to a better integration of community views.

Enhancements of public spaces in the surrounding communities were primarily applied to municipal parks, plazas, and schools, as a result of the project's comprehensive and ongoing reforestation program. Key stakeholders were engaged, and consultations led to modification of program plans to directly benefit affected stakeholders and the general community. Creation of new public spaces would further benefit the communities.

Vulnerable Groups

The Vulnerable Groups subcategory addresses the extent to which a project contributes to the quality of life of women and diverse groups. Infrastructure projects can bring valuable opportunities to the surrounding communities in the form of jobs, capacity building, healthcare, education, improvements in accessibility, the use of existing local infrastructure, and access to services, among others. Women and diverse groups often lack access to decision making, resources, land ownership, employment, and technical training. For this reason, identification and assessment of the needs and constraints of different groups that might benefit from opportunities provided by infrastructure projects is important in the sustainability of infrastructure projects.

The identifying and addressing the needs of diverse communities (but not women specifically) was one of the aspects considered by the NGETP Northeast Section. The indigenous Toba community in the province of Formosa was considered and consulted with regard to program plans, construction, and implementation. While the program received support from the community and included them in employment measures, additional considerations for meeting long-term benefits and positive contributions to the quality of life for women, in addition to the Toba community, would be favorable. Besides, as specified by Argentine equal opportunity policies, a minimun of woman enployees are required as well as training programs specific to women, employment diversification prospects and programs to support women-led opportunities are realized in the program.

In addition, other aspects were evaluated that show opportunity for greater consideration, specially that of stimulating and promoting women's economic empowerment, and that of improving access and mobility for women and diverse communities. Program design considerations that exceed Argentine regulations for these two aspects would improve the project's level of achievement in this subcategory.

4 LEADERSHIP CATEGORY

The Leadership category evaluates project team initiatives that establish communication and collaboration strategies early on, with the ultimate objective of achieving sustainable performance. Envision rewards stakeholder engagement as well as encompassing a holistic, long-term view of the project's life cycle. Leadership is distributed into three subcategories: Collaboration, Management, and Planning.

Collaboration

The Collaboration subcategory analyzes the level of leadership and commitment demonstrated by the project team to improve sustainable performance through the inclusion of input from stakeholders, the capture of synergies, and opportunities for innovation in managing the process. The NGETP displays solid practices in fostering collaboration and teamwork, as well as in providing for a wide variety of stakeholder involvement. However, improvements can be made in strengthening leadership and commitment to sustainable performance and supporting the integration of sustainability goals, objectives, and targets in their management systems.

While limited documentation has been provided regarding the project's announced commitment to specific sustainability programs and policies, appropriate roles and responsibilities are assigned and management processes and control mechanisms are clearly defined. The Northeast Section project team demonstrates a commitment to sustainable performance, particularly on the topic of reforestation. While the CAF oversees the project and its contractors, the inclusion of publicized core values that address sustainable performance and goals would demonstrate sustainability throughout the electricity transmission program.

Sustainability management systems include organizational policies and mechanisms directed to a project's sustainable performance. The project teams in the Northeast Section have demonstrated business processes and methodologies to manage project complexities and selected unexpected events, though no designated sustainability management system is in place. Establishment of such a sustainability management system aligned with NEA goals for sustainable performance would assist project preparedness in the future and give an expanded ability to address change and uncertainties.

Multiple parties are integrated into the NGETP; it is apparent that collaborative methods have been applied in project delivery and performance, as well as project monitoring programs to foster teamwork. A whole-systems design approach that includes demand source reductions, utilization of excesses within the system, and elimination of design conflicts and redundancies would foster greater collaboration and team integration. Meaningful risk and reward sharing through project leadership and contractor contracts would further advance sustainable performances.

Provisions for effective stakeholder identification, engagement, and involvement are solid in the Northeast Section program, including communication programs and instances to develop relationships with key stakeholders and involve them in project decision-making processes. The public input process is robust and was implemented in the planning, construction, and operational phases that resulted in design modifications and implementation revisions. Meaningful programs with stakeholders foster transparency in project decisions and enhance community involvement.

Management

The Management subcategory addresses a broader comprehensive understanding of the project to allow the team to pursue synergies between systems, either within the project or among larger infrastructure systems. Evidence was not provided of the extent to which by-product synergies were sought out with other nearby operating facilities; however, the NGETP has exercised assessment and integration with other elements of community infrastructure, at both regional and local scales.

The intent of the by-product synergy metric is to reduce waste, improve project performance, and minimize project costs through the identification and use of unwanted by-products or discarded material from nearby operations; it measures the degree to which the project management has sought out such materials. Evidence was not provided addressing collaborative efforts with other facilities in the practice of industrial ecology. Further research by the project team is suggested to find synergistic opportunities within the program scope that shift from optimization of individual components to system optimization and integration in the community.

Project integration with other elements of community infrastructure was achieved. At a regional scale, the project integrates the national electricity grid by connecting the northern region with the rest of the country in order to foster economic development through improved accessibility and efficiency of delivered electricity. At a local scale, the project location was determined based on utilization of existing railways, bridges, and transmission lines; this integration with existing infrastructure minimized the project's impacts and maximized its potential benefits. Roadway improvements were also made for individual system optimization as well as to support community mobility. Plans to consider additional restoration of natural systems and other community assets are suggested.

Planning

The Planning subcategory addresses a long-term view of the project's sustainability. Several planning issues are considered in this subcategory, such as long-term monitoring and maintenance plans and required resources, regulatory policies in relation to sustainability, and material life cycle and design approaches aimed at extending the project's useful life.

The NGETP incorporated robust planning and contractual obligations for long-term monitoring and maintenance to ensure ecological protection, mitigation, and enhancement according to Argentine law through CAF and contractor agreements. Project monitoring programs address legal, environmental, social, and maintenance aspects as well as providing recommendations for improved performance. Monthly monitoring is done by an independent agent and is supervised by CAF. The concessionaire contract establishes that long-term monitoring must be continued over the life of the project to ensure ecological protection.

The project complies with all Argentine laws and policies; however, no systematic assessment was done to identify standards, regulations, or policies that may unintentionally create barriers for the implementation of sustainable infrastructure practices. Engagement with regulatory bodies and decision makers to determinate legal barriers to sustainability should be considered in the implementation of future projects; this will contribute to resolving outstanding concerns and lead to the development of future institutional policies in sustainable infrastructure.

Elements of durability, flexibility, and resilience in the project's design and materials with the purpose of extending the project's useful life were not considered beyond standard practices. Assessment efforts aimed

at increased material-use flexibility and easier repair and adaptability should be considered that demonstrate how durable material use is an improvement on industry norms. Long-term cost savings in regard to reduced maintenance and reconfiguration can reduce investment and extend project payback.

The Resource Allocation category deals with material, energy, and water requirements during the construction and operation phases of infrastructure projects. The quantity and source of these elements as well as their impact on overall sustainability are investigated throughout this section of the Envision rating system. Envision guides teams to choose less toxic materials and promotes renewable energy resources. Resource Allocation is divided into three subcategories: Materials, Energy, and Water.

Materials

The Materials subcategory addresses sustainable practices related to the materials utilized in the project. Considerations include the reduction of the amount of energy required to produce and transport materials, support for sustainable procurement practices, use of recycled materials, use of regional materials, diversion of waste from landfills, reduction of excavated materials taken off site, and the ability to recycle and reuse materials at the end of the life of the project. The intention is to reduce the natural resources extracted and processed as well as the energy required. This subcategory considers matters such as balancing material reductions with safety, durability, and flexibility in processes, with the purpose of minimizing natural resource use. The NGETP has limited choice in the materials utilized for the project, maintaining traditional practices for this type of infrastructure.

The NGETP did not consider reduction of the energy embodied in the extraction, processing, manufacturing, and transport of materials used for the project. Conducting a life cycle assessment that evaluates net embodied energy use is recommended in order to identify the energy utilized, apply strategies for its reduction, and determine more sustainable operational processes for the lifespan of the project.

Additionally, sustainable procurement practices and the use of recycled material were also not considered in the project. The project's procurement practices could be analyzed, and metrics could be considered to identify suppliers of materials and equipment that implement sustainable practices toward protecting the environment, human health, and other social benefits in their manufacturing processes. Increasing the use of recycled or reclaimed materials for project construction and/or operation would minimize waste, embodied carbon emissions, and environmental degradation.

The project utilized between 70% to 100% of regionally sourced material,[24] thus minimizing adverse environmental transportation impacts such as greenhouse gas emissions and other pollutants, and retaining benefits to the region through the support of the regional economy. This was in part a result of Argentine regulations that promote the use of local materials whenever possible. Further identification of locally sourced materials or regionally sourced reused materials would be beneficial to the project.

As regards the quantity of waste generated by the completed project, the documentation provided demonstrates a comprehensive waste management plan during construction in order to divert waste from landfills and minimize the quantity of waste generated by maximizing opportunities for recycling or reuse. The same criteria should be extended during the project's operations. Nevertheless, environmental impacts were reduced by the on-site reuse of the excavated materials. Approximately 50% of inorganic materials that were generated as a result of excavation for tower foundations were transported off site, while approximately 100% of organic material was retained on site through reincorporation into the soil.[25] During operations, 30% of materials diverted to recycling or reused that include plastics, glass, wood, cables, packaging and bottle tops, was reported. Wood and cables were donated to and reused by local communities.[26] Additional assessments on future reuse opportunities for excavated inorganic material would improve the percentage.

Finally, opportunities for easier deconstruction and future reuse, reprocessing, or upcycling of components and materials at the end of the project's useful life should be integrated into the project's design. Scope expansion might include enhancing the flexibility of materials and design with this goal in mind.

Energy

This subcategory focuses on the energy utilized by the project during operation and maintenance phases. Aspects addressed include the reduction of overall energy use, the utilization of renewable energy sources to minimize fossil fuel consumption when feasible, and the commissioning and monitoring of energy systems throughout the life of the project to ensure its efficiency. The project managed a limited achievement in this regard, without integrating strategies to reduce energy consumption or promoting the use of renewable energy resources to meet energy needs. Nonetheless, considerations to ensure the efficient functioning and extend the useful life of the energy systems were included, and the project's life is expected to exceed 50 years.

The project meets the Argentine regulatory requirements that address energy consumption in construction. Further development of designs and processes that factor in energy consumption in the operational and maintenance periods, through a whole-systems approach to analyze environmental loads and impacts over the project's life, should yield a performance that goes beyond industry standards.

Renewable energy reduces the amount of energy required from fossil fuel sources, and the project could evaluate feasible nontraditional energy sources toward this goal. Project energy needs are met utilizing approximately 7% renewable energy sources based on the current matrix of Argentine energy generation sources.[27] Renewable energy use might be increased by considering other alternative sources, such as on-site generation via wind and solar or fuel alternatives, for operations and maintenance activities.

Energy performance in association with the commissioning and monitoring of a project's energy systems addresses user behavior. The program presented an initial commissioning of the energy systems and the incorporation of long-term monitoring by the concessionaire per the contractor contract; however, the type of monitoring system was not addressed. Further attention to the operational and monitoring phases of this project is advised, including annualized energy consumption and cost analyses to improve energy performance systems through monitoring and personnel training.

[24] Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (8 October 2015); Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with Zofnass Team, (27 January 2016).
[25] Ibid.
[26] Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with Zofnass Team, (27 January 2016).

Water

The Water subcategory examines how infrastructure projects reduce overall water use, protect freshwater availability, and reduce potable water consumption. Success comes through the integration of design features to minimize the long-term net negative impact on water sources, the inclusion of water-efficient equipment, use where possible of stormwater or gray water, and the implementation of monitoring systems to address the performance of water systems and their impact on receiving waters. The purpose of these strategies is to achieve a balance between regional needs, project needs, and the limited availability of water. The project achieved a moderate performance in this subcategory, without negative impacts on water availability and with the possibility of improvement by integrating strategies to reduce potable water consumption and monitoring the water utilized in the facilities connected to the program's operations.

Freshwater variability and vulnerability to extremes can affect long-term availability of a project's water consumption needs. Groundwater and surface water protection within the project scope will minimize longer-term adverse impacts on sources and quality. While the Northeast Section program stipulates specific and sound guidelines in relation to monthly water quality monitoring programs, additional design attention to organizational water management policies that specify freshwater availability and use in operations is recommended, including additional assessments of replenishment and/or recharge to increase volumes and improve quality of water sources.

Potable water consumption in industry can be reduced through the application and use of alternative sources such as gray water, recycled water, and stormwater to meet project water use demands. Going beyond industry norms can provide cost-effective alternatives and net positive results on availability and quality. However, according to the information provided, no design strategies were considered in the program to reduce overall potable water consumption and encourage the reuse of nonpotable. During operation and maintenance phases, potable water reduction strategies could be identified and implemented.

Water monitoring systems enable the detection of operational leaks, flows, and usages that can prevent unnecessary waste and pollution in potable water systems. Additional, long-term water use monitoring will enhance a project's sustainability goals through control measures. Although the project has determined policies and monitoring systems in regard to directly affected watershed areas, further monitoring systems to detect internal consumption and leaks, including the use of submeters, were not considered in the design plans. Additional consideration of operational efficiencies and usage monitoring will help mitigate adverse impacts on water quantity and quality.

[27] Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (8 October 2015).

6 NATURAL WORLD CATEGORY

The Natural World subcategory focuses on how infrastructure projects may impact natural systems and promotes opportunities for positive synergistic effects. Envision encourages strategies for conservation and distinguishes projects with a focus on enhancing surrounding natural systems. Natural World is subdivided into three subcategories: Siting, Land and Water, and Biodiversity.

Siting

The Siting subcategory evaluates a project's choice of location and whether it avoids or minimizes direct and indirect impacts on important ecological services and areas of high ecosystem value, such as water bodies or wetlands. The credits in this subcategory assess project mitigation measures in the design, construction, and implementation phases that seek to protect these sensitive areas and avoid disrupting natural cycles. They also reward efforts to site projects on previously developed or disturbed areas such as grayfields or brownfields in order to conserve undeveloped land, and measures to avoid development in adverse geology and steep slopes. The NGETP program demonstrated a sensitive approach in siting the extra-high-tension transmission line, evaluating different alternatives to minimize the environmental impacts of the line.

Efforts in infrastructure projects to preserve prime habitat and minimize disruptions can protect biodiversity; planning considerations that avoid areas of high ecosystem value and create buffer zones can minimize direct and indirect impacts. The program considered transmission line placement avoiding areas of high ecological value and included restoration efforts through its reforestation program, which increases prime habitat areas by replanting with native-species trees. Additional focus on increasing buffer zones to augment habitat connectivity can be considered.

Aquatic habitat preservation was evaluated closely by the project team, with attention given to avoidance of sensitive areas, construction design, inclusion of buffer zones, infiltration, drainage and water quality preservation, and emergency response plans. Further restoration of previously degraded wetland areas and enhancements to natural floodplain functions for riparian habitats will bolster effectiveness. The impact of the program on agricultural farmland was also considered, and negative impacts were minimized through evaluation of different alternatives for the main transmission line and stakeholder engagement programs.

Locating infrastructure projects in geologic formations that include fault zones and steep slopes can create environmental, community, and operational hazards, with increased danger of landslides, flooding, and other natural hazards. The program included extensive geologic, geomorphic, and topological studies to identify geological risks, as well as to minimize any possible negative impacts on aquifers and other water bodies. It was determined that the project does not affect these systems, but programs are in place for continual monitoring. Among the considerations in evaluating alternative locations for the main transmission line were minimization of erosion and prevention of landslides, with the aim to avoid unnecessary risks that could damage both the infrastructure and the environment. Further focus on minimizing future potential erosion is recommended in monitoring programs throughout the life of the project.

Finally, greenfields preservation was not part of project considerations, because the major part of the land affected by the main transmission line was agricultural. Nonetheless, for complementary facilities such as

substations, it is recommended to avoid using undeveloped areas and consider the use of sites such as greyfields or cleanup sites classified as brownfields.

Land and Water

The focus of the Land and Water subcategory is the minimization of impacts of infrastructure projects on existing hydrologic and nutrient cycles. An introduction of pollutants can disrupt natural cycles, especially if cumulated with the effects of other, nearby projects as well as effects over the lifetime of the project. The program achieved a high performance in this subcategory, especially in relation to reducing pesticides and fertilizer impacts and preventing surface and groundwater contamination.

Non-point-source pollution controls, reducing the quantity, toxicity, bioavailability, and persistence of pesticides and fertilizers are important to avoid contamination of water bodies caused by runoff. According to the Environmental Management Plan, the protection of flora, fauna, land, and hydrological resources addresses the minimization of chemicals harmful to the environment. A noteworthy attribute is the utilization of only noninvasive, native-species trees in the project's extensive reforestation program that do not require application of pesticides and fertilizers. Further analysis is suggested of long-term maintenance practices in substation locations, where the reforestation program was not implemented.

Surface and groundwater contamination measurement and management protocols address the prevention and minimization of compromised water quality. Hydrological studies and project management plans to curtail adverse impacts over the life of the project were evaluated. The project conducted extensive studies to determine potential adverse impacts in the construction and operational phases; the results indicated that there would be minimal impacts. Continued application of containment plans in the operational phase is outlined in the concessionaire contracts, and corresponding policies are in place to manage spills and leaks. Further analysis of longer-term effects and improved restoration efforts will assist in future and nearby contamination restoration, with enhanced detail in monitoring programs.

Regarding stormwater runoff, the project addressed planning and implementation activities to reduce impervious surfaces and increase water infiltration in soils, in addition to augmenting plant absorption and expiration. The main transmission lines do not increase impervious surfaces, so ground infiltration of stormwater is minimally impacted. The project implements effluent management programs in line construction activities; however, additional long-term stormwater management should be considered, along with improvements in storage and infiltration capacities, specifically with the project's impacts at substation facilities.

Biodiversity

The Biodiversity subcategory examines how infrastructure projects minimize negative impacts on natural species and their habitats through specific plans and policies that address important on-site and nearby species biodiversity concerns. The NGETP achieved a good performance in relation to controlling invasive species through the use of native flora in revegetation practices, restoring 100% of soils disturbed by the easement strip of the transmission line, and protecting wetland and surface water functions. Still further efforts can be integrated in order to support habitat connectivity and facilitate species movement. The greatest achievements are associated with restoration of disturbed soil, the control of invasive species, and maintenance of wetland functions via the project's nature, design, and control programs.

Habitat preservation and connectivity promote genetic diversity and allow for species to move across habitats. Infrastructure projects can not only mitigate destruction but also enhance existing habitats and/or create

new ones. The NGETP assessed habitats affected by the project and created mitigation measures for habitat protection, specifically related to its reforestation program of approximately 600,000 native-species trees to replace cleared trees across the approximately 2,750 Ha of service area, according to the documentation on the reforestation plan.[28]

Nonendemic flora and fauna species adversely affect habitats by forcing out native species and creating competition for nutrients, light, space, and water. Management plans can be implemented to control nonnative species and restore habitats to their native states. The project has extensive programs for reforestation of native Prosopis alba trees beyond restoration of areas cleared for project construction and operation. Specific programs to eliminate nonnative species were not considered, however. Further attention to reduction of nonendemics would further support the project's native reforestation efforts.

Restoration of soils disrupted by construction activities and by other, previous development projects can improve hydrological and ecological functions to support plants, biological communities, and water storage and filtration, and to minimize flooding. The project restored 100% of soils affected by construction activities, and policies are in place to disrupt soils only to the extent necessary for project construction and operation. Additional programs are advised to include further area-wide restoration efforts beyond those required by government regulations.

Wetland and riparian areas perform critical ecosystem functions. Maintaining, enhancing, and restoring these areas can be addressed through hydrologic connections, water quality, habitats, and sediment transport. The project maintains hydrologic connections in surface waters, and groundwater pumping is not employed throughout the life of the project. Adherence is required to monthly wetland monitoring programs in the construction phase, as defined in the contractor contract. Sediment transport, however, was not considered, because it was determined nonapplicable to the project per the environmental analyses. The project can improve wetland and surface water management through restoration of compromised areas, beyond maintaining existing conditions.

[28] Ministerio de Planificación Federal, Inversión Pública y Servicios. *Plan de Reforestación NEA-NOA* (18 July 2012), 9-11.

CLIMATE & RISK CATEGORY

Envision aims to promote infrastructure developments that are sensitive to long-term climate disturbances. The Climate and Risk category focuses on avoiding direct and indirect contributions to greenhouse gas emissions, as well as promoting mitigation and adaptation actions to ensure short- and long-term resilience to hazards. Climate and Risk is subdivided into two subcategories: Emissions and Resilience.

Emissions

The Emissions subcategory evaluates the reduction of dangerous pollutants and greenhouse gas emissions throughout the life cycle of a project. Emissions can affect both short-term and long-term project risks, and minimization of the associated risks can protect against future problems. Greenhouse gas emissions may not directly affect a project, but the reduction of greenhouse gas emissions can reduce a widespread global risk beyond the project's site boundaries.

Increased levels of carbon dioxide through the burning of carbon-based fuels can result in an increase in extreme weather events and other consequences such as flooding and drought, on both a global and regional level. A carbon footprint assessment can be conducted, including carbon sequestration as well as emissions for the life of a project. The NGETP did not conduct a carbon footprint assessment but has contributed to carbon sequestration through its reforestation program. It is estimated that 13,800,000 tons of CO2 are sequestered by the project's NEA reforestation program annually. Future analysis of carbon assessments to include activities and materials used would assist the project in systematic reductions.

Envision evaluates a project's air pollutant emissions of six criteria pollutants: carbon monoxide, nitrogen oxides, sulfur dioxide, suspended particulate matter less than PM-10, ground-level ozone, and lead. These pollutants cause adverse effects on health, the environment, and property. Project dust generation can aggravate the effects. The project employed policies, management plans, and monitoring procedures to assess and control air pollutant emissions, namely of oils, grease, hydrocarbons, and dust. As the greatest adverse effects were a result of construction activities, compliance mandates were focused on the movement and operation of equipment, with attention paid to the minimization of dust, oils, grease, and hydrocarbons. More stringent standards are recommended for air pollutant reductions that align with the California Ambient Air Quality Standards or the South Coast Air Quality Management. Further actions to reduce existing pollutant levels and inclusion of additional pollutants on the criteria list would mitigate additional emissions, including ground-level ozone, sulfur oxides, and nitrogen oxides.

Resilience

The Resilience subcategory addresses a project's ability to withstand short-term risks associated with events such as fires and flooding, and its adaptations to longer-term changes in weather patterns and climate. Project evaluation of risks and probabilities associated with design and adaptation strategies can minimize an infrastructure project's vulnerability to these conditions, as well as ensure a longer useful life and help meet future community needs.

Climate change effects can alter an infrastructure project's ability to provide basic services, and greenhouse gas reductions in a project may help minimize future impacts of climate change that may result in climate variations

including weather patterns, increase in extreme weather-related events, and other hazards. The NGETP would benefit from a comprehensive climate impact assessment and adaptation plan to prepare the project and affected communities to minimize related hazards.

Project design criteria can assess infrastructure adaptation systems that account for long-term effects of resource depletion, extreme natural or human-caused events, or economic changes, and how well a project avoids traps and vulnerabilities in its operating systems that might affect its communities. The NGETP should consider community-wide trap avoidance and vulnerability assessments in order to integrate these aspects into the design criteria, going beyond a cost-basis analysis as a driver of risk management and mitigations.

Climatic conditions may change, and infrastructure projects that are designed for current conditions may be inadequate in future scenarios if they are unable to recover in extreme events. A project's plans and programs to adapt and respond to changing conditions will help mitigate adverse impacts on its operations. Beyond the protection of wetland areas and the reforestation program, additional considerations are recommended, including supply chain options and structural changes, to ensure project resiliency in adapting to long-term climate change effects.

Project-specific short-term hazards were assessed and accounted for in the project. Resilience to short-term hazards (including earthquakes, flooding, and wildfires, among others) can assist in long-term recovery capabilities, and management of these hazards promotes project longevity and community security. Concise and applicable short-term hazard plans were employed in the project through the contractor contracts. Most notable are specific standards in relation to fire protection hazards. In electrical transmission, fires pose a significant threat to human well-being, electricity supply, and equipment. Recommendations for further design plans that consider potential hazards beyond the stated 50-year lifespan of the project might minimize associated risks. The integration of environmental restoration as a strategy to minimize the risk of future hazards is also recommended.

Heat island effects can affect area microclimates and increase the need for energy consumption for cooling. Use of highly reflective materials and increased area vegetation can mitigate heat island effects. The project's effect on heat island generation was determined to be minimal; further consideration of mitigation measures can be considered in the substation locations, however, in combination with the application of the reforestation program to urbanized areas to provide shading to hard surfaces and minimize the urban heat island effect.

APPENDIX A: PROJECT PICTURES AND DRAWINGS

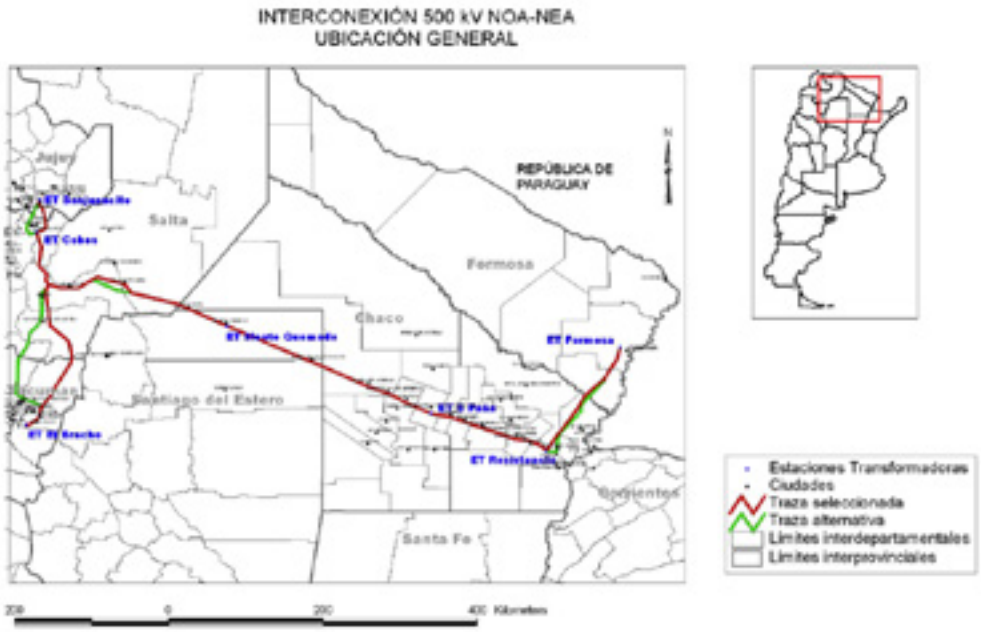

Figure 5: Location map.
Source: Ministerio de Planificación Federal et al. EIA. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV (March 2006), 423.

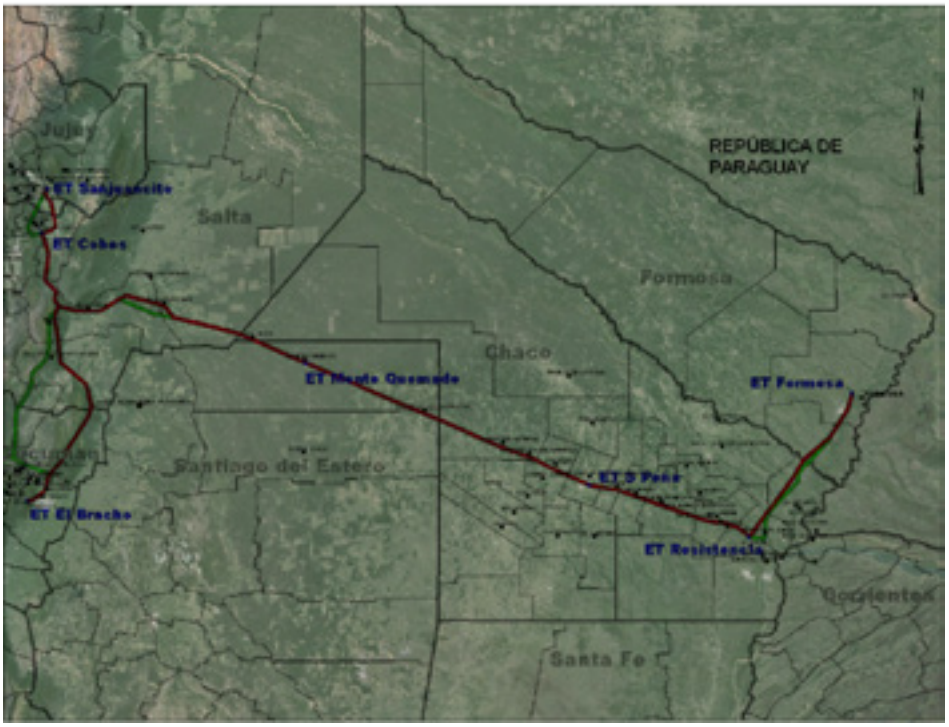

Figure 6: Location map.
Source: Google earth, Ministerio de Planificación Federal et al. EIA. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV (March 2006), 423.

Figure 7: Transmission station
Sources: Courtesy of Alberto Levy.

Figure 8: Transmission station Formosa (May 2009)
Source: IDB. Informe de Supervisión Ambiental: Transmisión Eléctrica para el Norte Grande. (Argentina: 06 April 2011), 9.

Figure 9: Transmission station Formosa (April 2011)
Source: IDB. Informe de Supervisión Ambiental: Transmisión Eléctrica para el Norte Grande. (Argentina: 06 April 2011), 9.

Figure 10: Transmission Station Sáenz Peña
Source: IDB. Informe de Supervisión Ambiental: Transmisión Eléctrica para el Norte Grande. (Argentina: 06 April 2011), 9.

Figure 11: Transmission station Resistencia
Source: IDB. Informe de Supervisión Ambiental: Transmisión Eléctrica para el Norte Grande. (Argentina: 06 April 2011), 9.

Figure 12: Transmission station Monte Quemado
Source: IDB. Informe de Supervisión Ambiental y Social: Programa Transmisión Eléctrica para el Norte Grande. (Argentina: 23 April 2012), 10.

Figure 13: Transmission station Cobos
Source: Ministerio de Planificación Federal et al. EIA. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV (March 2006), 395.

Figure 14: Transmission station Resistencia
Source: Ministerio de Planificación Federal et al. EIA. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV (March 2006), 365.

Figure 15: Transmission station Resistencia from Ruta Nacional 16
Source: Ministerio de Planificación Federal et al. EIA. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV (March 2006), 365.

Figure 16: Transmission station Resistencia, view of the 132 kV towers.
Source: Ministerio de Planificación Federal et al. EIA. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV (March 2006), 366.

Figure 17: Easement strip of LEAT 500kV, clear and free from trees.
Source: Ministerio de Planificación Federal et al. EIA. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV (March 2006), 366.

Figure 18: 132 kV transmission line
Source: Ministerio de Planificación Federal et al. EIA. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV (March 2006), 366.

Figure 19: Transmission line structure
Source: Ministerio de Planificación Federal et al. EIA. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV (March 2006), 375.

Figure 20: Two 132kV transmission lines, located parallel to Ruta 34 towards Rio de las Piedras.
Source: Ministerio de Planificación Federal et al. EIA. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV (March 2006), 397

Figure 21: Transmission Station El Brancho
Source: Ministerio de Planificación Federal et al. EIA. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV (March 2006), 405.

Figure 22: Storage Site for Towers
Source: Alejandro Fros (ENE/CAR), Juan Carlos Páez Zamora (VPS/ESG) et al. Reporte de Misión, Misión de Supervisión Ambiental AR-L1021. (May 2009), 8.

Figure 23: On-site assembly of tower
Source: Alejandro Fros (ENE/CAR), Juan Carlos Páez Zamora (VPS/ESG) et al. Reporte de Misión, Misión de Supervisión Ambiental AR-L1021. (May 2009), 8.

Figure 24: On-site assembly of transmission station
Source: IDB. Informe de Supervisión Ambiental: Transmisión Eléctrica para el Norte Grande. (Argentina: 06 April 2011), 10.

Figure 25: Free Standing Structure
Source: IDB. Informe de Supervisión Ambiental: Transmisión Eléctrica para el Norte Grande. (Argentina: 06 April 2011), 10.

Figure 27: Nursery seedling Pampa de los Guanacos
Source: CONSISTRA, Programa de Transmisión Eléctrica del Norte Grande. Servicios de Consultoría para la Asistencia Técnica y la Inspección Técnico-Ambiental de la Interconexión NEA-NOA. Tramo Este. Informe Nº IM-ES-40 (February 2012), 9.

Figure 26: Seedling production nursery
Source: LINSA SA, Informe Auditoria Ambiental Final. Sistema de Interconexión LAT 500 kV NEA-NOA Subtramo Este (April 2012), 1.

Figure 28: Students from Escuela Agrotécnica El Quebrachal setting up seedlings.
Source: IDB. Informe de Supervisión Ambiental y Social: Programa Transmisión Eléctrica para el Norte Grande. (Argentina: 23 April 2012), 10.

Figure 29: Reforestation area in El Carmen, Jujuy
Source: IDB. Informe de Supervisión Ambiental y Social: Programa Transmisión Eléctrica para el Norte Grande. (Argentina: 23 April 2012), 10.

Figure 30: Planting in a Municipal School.
Source: Municipalidad Ciudad de Córdoba. Informe del Programa de Forestación con Prosopis Alba en la ciudad de Córdoba, 4.

Figure 31: Distribution of seedlings to residents of the city.
Source: Municipalidad Ciudad de Córdoba. Informe del Programa de Forestación con Prosopis Alba en la ciudad de Córdoba, 4.

APPENDIX B: ENVISION POINTS TABLE

			MEJORA	AUMENTA	SUPERIOR	CONSERVA	RESTAURAR
QUALITY OF LIFE	PURPOSE	QL 1.1 Improve community quality if life	2	5	10	20	25
		QL 1.2 Stimulate sustainable growth and development	1	2	5	13	16
		QL 1.3 Develop local skills and capabilities	1	2	5	12	15
	WELLBEING	QL 2.1 Enhance public health and safety	2	--	--	16	
		QL 2.2 Minimize noise and vibration	1	--	--	8	11
		QL 2.3 Minimize light pollution	1	2	4	8	11
		QL 2.4 Improve community mobility and access	1	4	7	14	
		QL 2.5 Encourage alternatives modes of transportation	1	3	6	12	15
		QL 2.6 Improve site accessability, safety and wayfinding	--	3	6	12	15
	COMMUNITY	QL 3.1 Preserve historic and cultural resources	1	--	7	13	16
		QL 3.2 Preserve views and local character	1	3	6	11	14
		QL 3.3 Enhance public space	1	3	6	11	13
	VULNERABLE GROUPS	QL 4.1 Identify and adress the needs of women and diverse communities*	1	2	3	4	
		QL 4.2 Stimulate and promote women's economic empowerment	1	2	3	4	
		QL 4.3 Improve access and mobility of women and diverse communities*	1	2	3	4	5
						Maximum QL Points:	194"
LEADERSHIP	COLLABORATION	LD 1.1 Provide effective leadership and commitment	2	4	9	17	
		LD 1.2 Establish a sustainability management system	1	4	7	14	
		LD 1.3 Foster collaboration and teamwork	1	4	8	15	
		LD 1.4 Provide for stakeholder involvement	1	5	9	14	
	MANAGEMENT	LD 2.1 Pursue by-product synergy opportunities	1	3	6	12	15
		LD 2.2 Improve infrastructure integration	1	3	7	13	16
	PLANNING	LD 3.1 Plan for long-term monitoring and maintenance	1	3	--	10	
		LD 3.2 Address conflicting regulations and polices	1	2	4	8	
		LD 3.3 Extend useful life	1	3	6	12	
						Maximum LD Points:	121"
RESOURCE ALLOCATION	MATERIALS	RA 1.1 Reduce net embodied energy	2	6	12	18	
		RA 1.2 Support sustainable procurement practices	2	3	6	9	
		RA 1.3 Use recycled materials	2	5	11	14	
		RA 1.4 Use regional materials	3	6	9	10	
		RA 1.5 Divert waste from landfills	3	6	8	11	
		RA 1.6 Reduce excavated materials taken off site	2	4	5	6	
		RA 1.7 Provide for deconstruction recycling	1	4	8	12	
	ENERGY	RA 2.1 Reduce energy consumption	3	7	12	18	
		RA 2.2 Use renewable energy	4	6	13	16	20
		RA 2.3 Commission and monitor energy systems	--	3	--	11	
	WATER	RA 3.1 Protect fresh water availability	2	4	9	17	21
		RA 3.2 Reduce potable water consumption	4	9	13	17	21
		RA 3.3 Monitor water systems	1	3	6	11	
						Maximum RA Points:	182"
NATURAL WORLD	SITING	NW 1.1 Preserve prime habitat	--	--	9	14	18
		NW 1.2 Protect wetlands and surface water	1	4	9	14	18
		NW 1.3 Preserve prime farmland	--	--	6	12	15
		NW 1.4 Avoid adverse geology	1	2	3	5	
		NW 1.5 Preserve floodplain functions	2	5	8	14	
		NW 1.6 Avoid unsuitable development on steep slopes	1	--	4	6	
		NW 1.7 Preserve greenfields	3	6	10	15	23
	LAND & WATER	NW 2.1 Manage stormwater	--	4	9	17	21
		NW 2.2 Reduce pesticide and fertilizer impacts	1	2	5	9	
		NW 2.3 Prevent surface and groundwater contamination	1	4	9	14	18
	BIODIVERSITY	NW 3.1 Preserve species biodiversity	2	--	--	13	16
		NW 3.2 Control invasive species	--	--	5	9	11
		NW 3.3 Restore disturbed soils	--	--	--	8	10
		NW 3.4 Maintain wetland and surface water functions	3	6	9	15	19
						Maximum NW Points:	203"
CLIMATE & RISK	EMISSIONS	CR 1.1 Reduce greenhouse gas emissions	4	7	13	18	25
		CR 1.2 Reduce air pollutant emissions	2	6	--	12	15
	RESILIENCE	CR 2.1 Assess climate threat	--	--	--	15	
		CR 2.2 Avoid traps and vulnerabilities	2	6	12	16	20
		CR 2.3 Prepare for long-term adaptability	--	--	--	16	20
		CR 2.4 Prepare for short-term hazards	3	--	10	17	21
		CR 2.5 Manage heat islands effects	1	2	4	6	
						Maximum CR Points:	122"
						Maximum TOTAL Points:	822"

*Indigenous or afro-descendant peoples
**Not every credit has a restorative level. Therefore totals include the maximum possible points for each credit whether conserving or restorative.

APPENDIX C: GRAPHS

NORTE GRANDE ELECTRICITY TRANSMISSION PROGRAM - NEA
PROGRAMA NORTE GRANDE TRANSMISSION - NEA

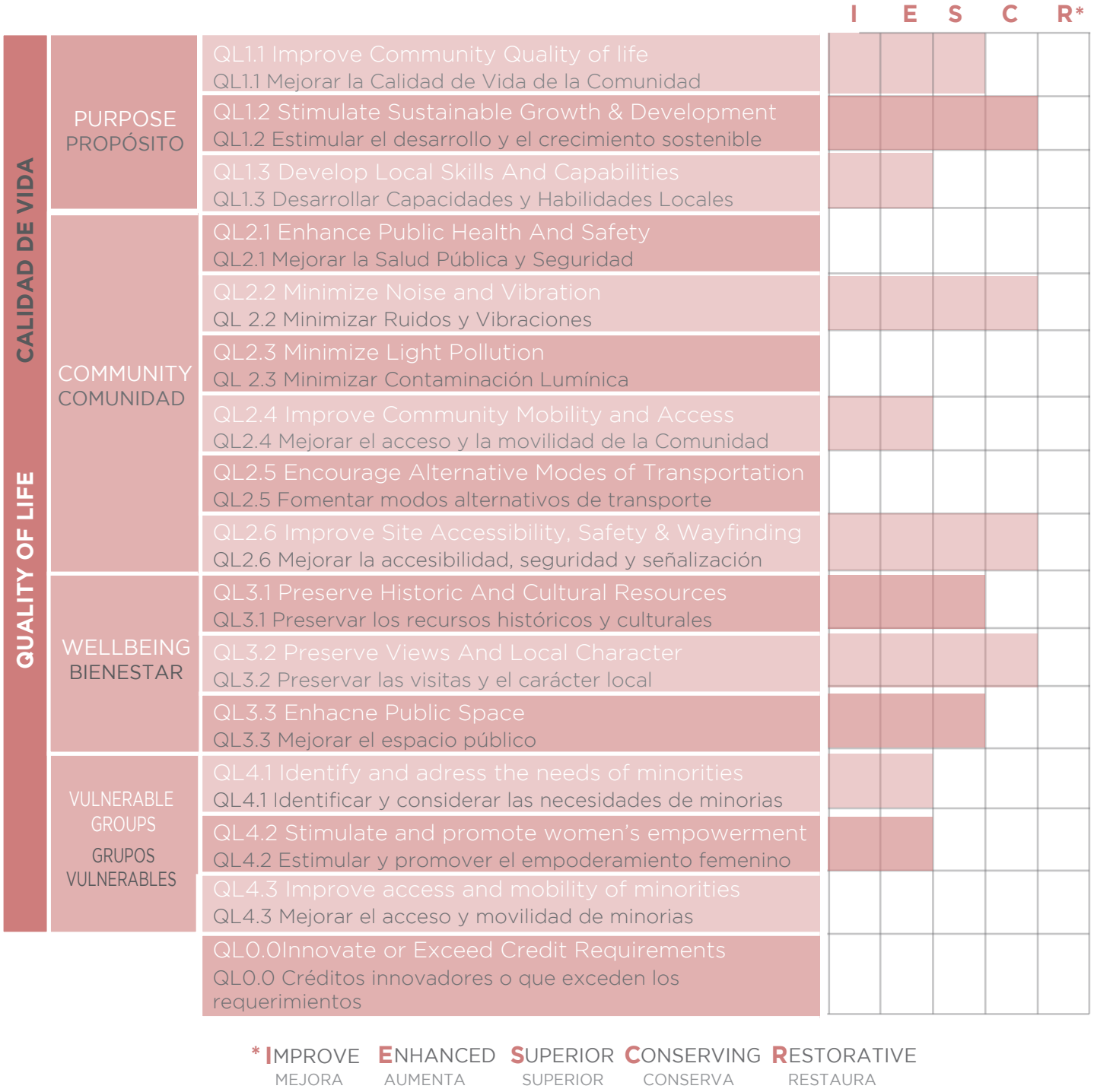

Figure 32: Quality of Life category Summary of results

NORTE GRANDE ELECTRICITY TRANSMISSION PROGRAM - NEA
PROGRAMA NORTE GRANDE TRANSMISSION - NEA

Figure 33: Leadership category Summary of results

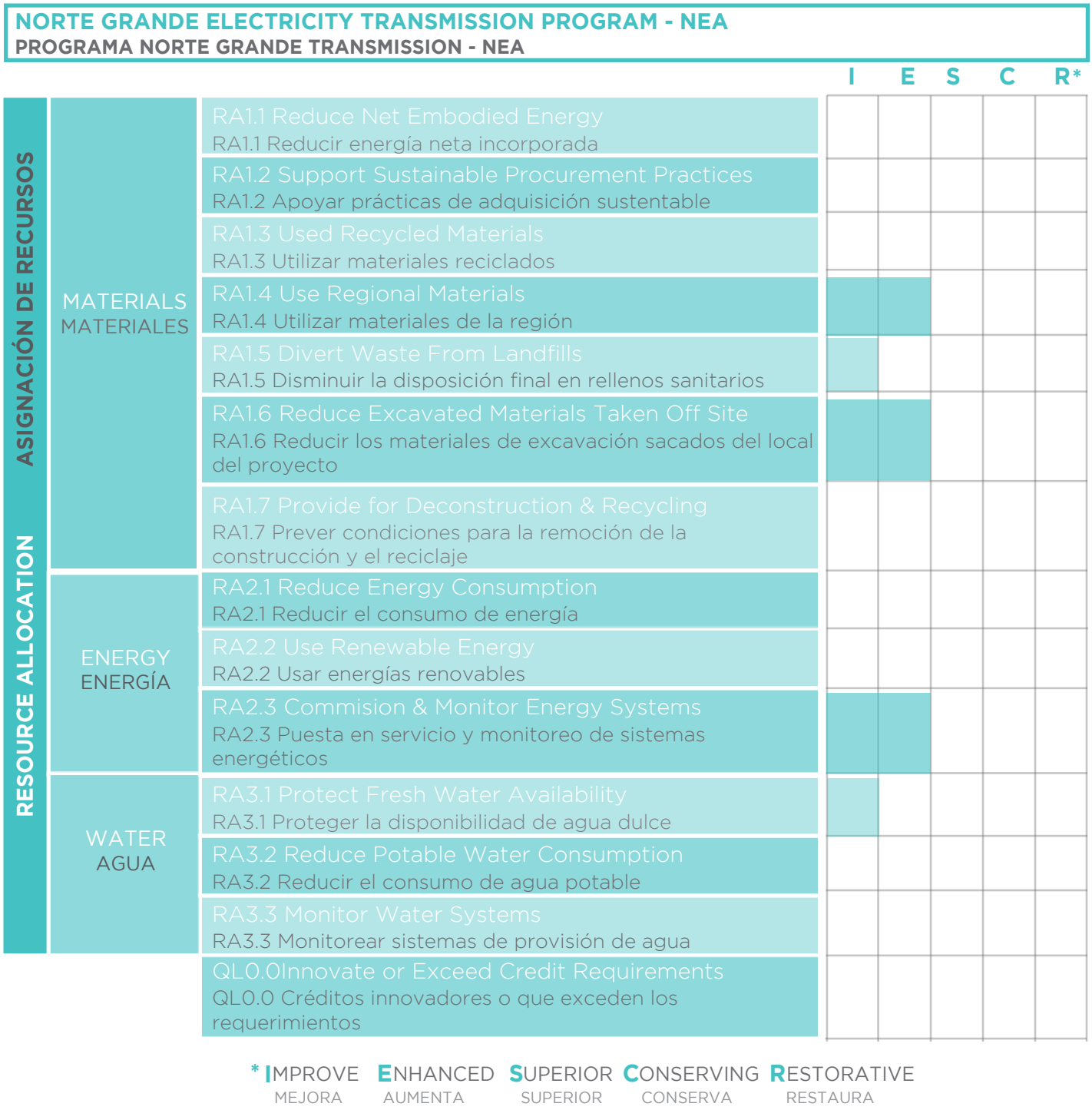

Figure 34: Resource Allocation category Summary of results

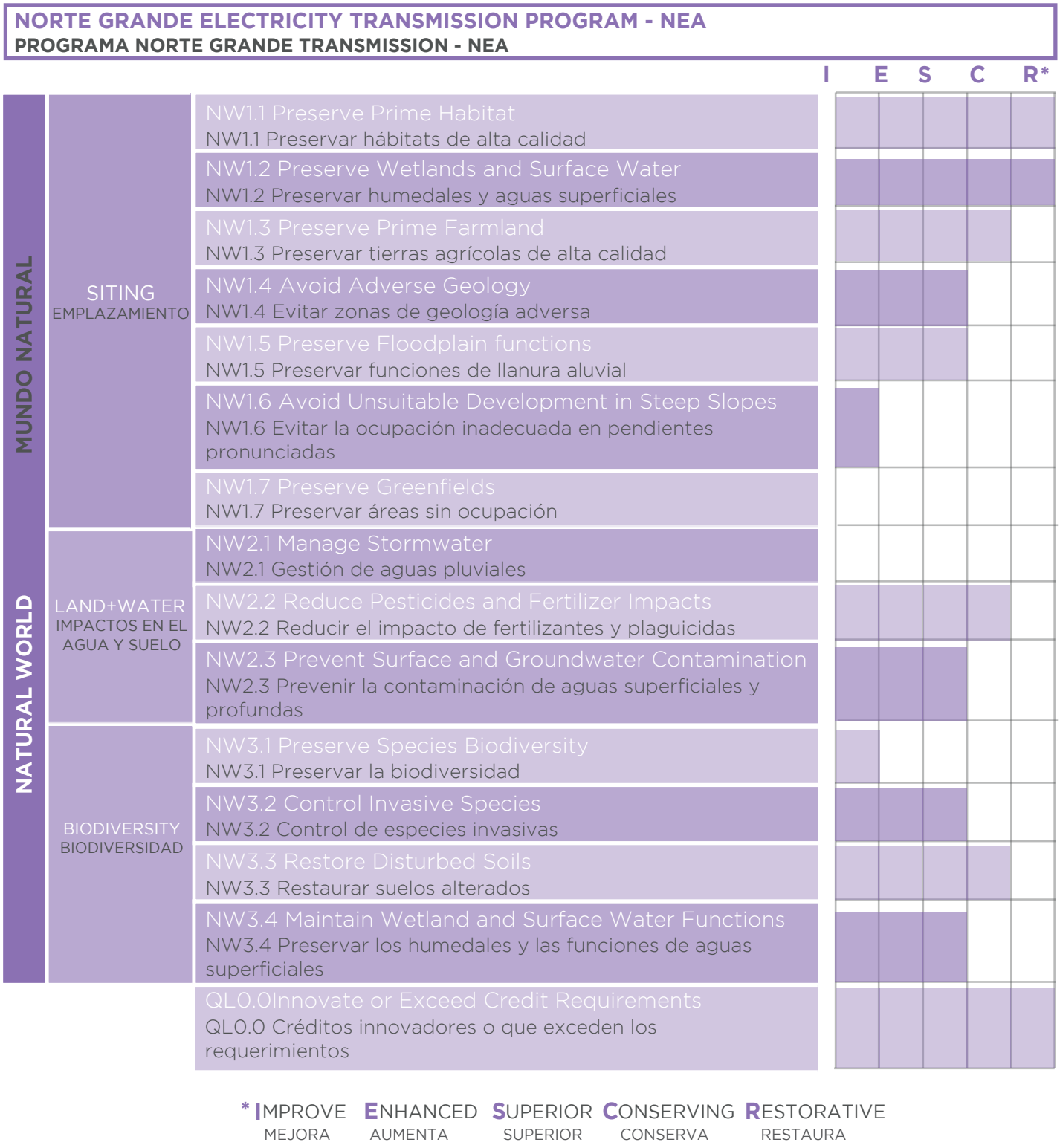

Figure 35: Natural World category Summary of results

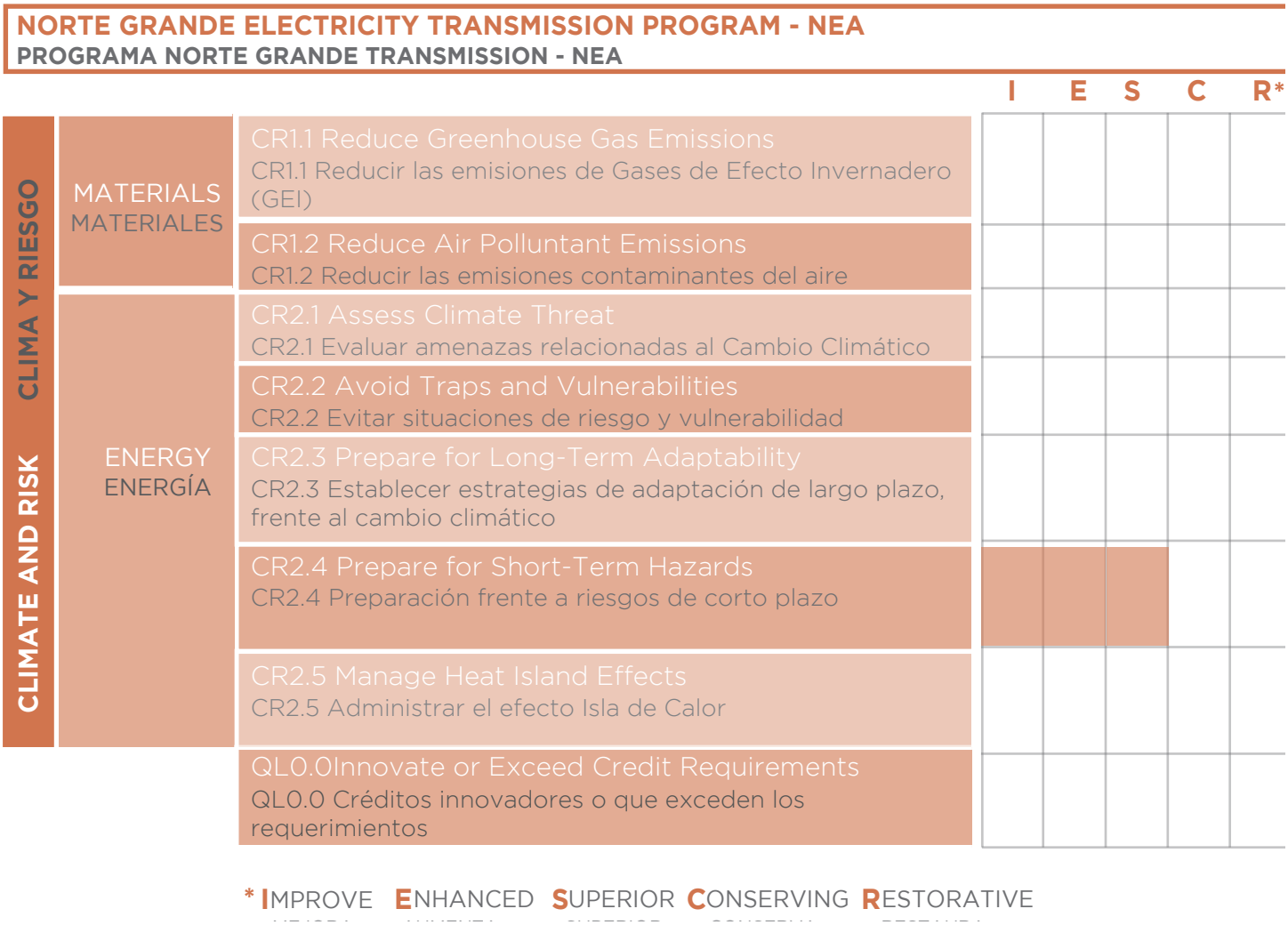

Figure 36: Climate & Risk category Summary of results

			NORTE GRANDE TRANSMISSION LINE, ARGENTINA	PT.	PERFORMANCE
1	QUALITY OF LIFE	PURPOSE	QL1.1 Improve community quality if life	10	Superior
2			QL1.2 Stimulate sustainable growth and development	13	Conserving
3			QL1.3 Develop local skills and capabilities	2	Enhanced
4		WELLBEING	QL2.1 Enhance public health and safety	0	No score
5			QL2.2 Minimize noise and vibration	8	Conserving
6			QL2.3 Minimize light pollution	0	No score
7			QL2.4 Improve community mobility and access	4	Enhanced
8			QL2.5 Encourage alternatives modes of transportation	0	No score
9			QL2.6 Improve site accessability, safety and wayfinding	12	Conserving
10		COMMUNITY	QL3.1 Preserve historic and cultural resources	7	Superior
11			QL3.2 Preserve views and local character	11	Conserving
12			QL3.3 Enhance public space	6	Superior
13		VULNERABLE GROUPS	QL4.1 Identify and adress the needs of women and diverse communities*	2	Enhanced
14			QL4.2 Stimulate and promote women's economic empowerment	2	Enhanced
15			QL 4.3 Improve access and mobility of women and diverse communities*	0	No score
			QL0.0 Innovate or Exceed Credit Requirements	0	N/A
			QL	77	

			NORTE GRANDE TRANSMISSION LINE, ARGENTINA	PT.	PERFORMANCE
16	LEADERSHIP	COLLABORATION	LD 1.1 Provide effective leadership and commitment	4	Enhanced
17			LD 1.2 Establish a sustainability management system	7	Superior
18			LD 1.3 Foster collaboration and teamwork	4	Enhanced
19			LD 1.4 Provide for stakeholder involvement	9	Superior
20		MANAGEMENT	LD 2.1 Pursue by-product synergy opportunities	0	No score
21			LD 2.2 Improve infrastructure integration	7	Superior
22		PLANNING	LD 3.1 Plan for long-term monitoring and maintenance	3	Enhanced
23			LD 3.2 Address conflicting regulations and polices	0	No score
24			LD 3.3 Extend useful life	1	Improved
			LD0.0 Innovate Or Exceed Credit Requirements	0	N/A
			LD	35	

NORTE GRANDE TRANSMISSION LINE, ARGENTINA		PT.	PERFORMANCE
25	RESOURCE ALLOCATION	MATERIALS	
26			RA 1.1 Reduce net embodied energy	0	No score
27			RA 1.2 Support sustainable procurement practices	0	No score
28			RA 1.3 Use recycled materials	0	No score
29			RA 1.4 Use regional materials	6	Enhanced
30			RA 1.5 Divert waste from landfills	3	Improved
31			RA 1.6 Reduce excavated materials taken off site	4	Enhanced
32			RA 1.7 Provide for deconstruction recycling	0	No score
33		ENERGY	RA 2.1 Reduce energy consumption	0	No score
34			RA 2.2 Use renewable energy	0	No score
35			RA 2.3 Commission and monitor energy systems	3	Enhanced
36		WATER	RA 3.1 Protect fresh water availability	2	Improved
37			RA 3.2 Reduce potable water consumption	0	No score
			RA 3.3 Monitor water systems	0	No score
			RA0.0 Innovate Or Exceed Credit Requirements	0	N/A
			RA	18	

NORTE GRANDE TRANSMISSION LINE, ARGENTINA		PT.	PERFORMANCE
38	NATURAL WORLD	SITING	
39			NW 1.1 Preserve prime habitat	18	Restorative
40			NW 1.2 Protect wetlands and surface water	18	Restorative
41			NW 1.3 Preserve prime farmland	12	Conserving
42			NW 1.4 Avoid adverse geology	3	Superior
43			NW 1.5 Preserve floodplain functions	8	Superior
44			NW 1.6 Avoid unsuitable development on steep slopes	1	Improved
45			NW 1.7 Preserve greenfields	0	No score
46		LAND & WATER	NW 2.1 Manage stormwater	0	No score
47			NW 2.2 Reduce pesticide and fertilizer impacts	9	Conserving
48			NW 2.3 Prevent surface and groundwater contamination	9	Superior
49		BIODIVERSITY	NW 3.1 Preserve species biodiversity	2	Improved
50			NW 3.2 Control invasive species	5	Superior
51			NW 3.3 Restore disturbed soils	8	Conserving
			NW 3.4 Maintain wetland and surface water functions	9	Superior
			NW0.0 Innovate Or Exceed Credit Requirements	9	N/A
			NW	111	

			NORTE GRANDE TRANSMISSION LINE, ARGENTINA	PT.	PERFORMANCE
52	CLIMATE	EMISSIONS	CR 1.1 Reduce greenhouse gas emissions	0	No Score
53			CR 1.2 Reduce air pollutant emissions	0	No Score
54		RESILIENCE	CR 2.1 Assess climate threat	0	No Score
55			CR 2.2 Avoid traps and vulnerabilities	0	No Score
56			CR 2.3 Prepare for long-term adaptability	0	Superior
57			CR 2.4 Prepare for short-term hazards	10	No Score
58			CR 2.5 Manage heat islands effects	0	No Score
			CR0.0 Innovate Or Exceed Credit Requirements	0	N/A
			CR	10	

Total Points	**251**

CATEGORY I, PEOPLE AND LEADERSHIP

SUB CATEGORY: QUALITY OF LIFE

	Score	NGETP - NORTHEAST SECTION (NEA)
QL1.1 IMPROVE COMMUNITY QUALITY OF LIFE	10	**Superior**
		Application of community engagement practices in the planning, construction and operational phases of NEA executed was in accordance with Argentine law. Communities affected by the NEA transmission program engaged in public consultation as well as governmental and private stakeholder entities. In addition, community communication programs were introduced in order to establish engagement standards and procedures for contractors. Key community stakeholders went through a systematic process of various methods, including newspaper publication, posted signage, and public consultation sessions. These methods collected opinions and suggestions from the community, non-governmental organizations, and other interested parties. Furthermore, revisions and modifications to the transmission program were rendered in alignment with community goals or needs. For example, the modification of the initial transmission line path in the province of Santiago del Estero positioned the LEAT 500 kV transmission line in the Mennonite community of Pampa de los Guanacos, adversely affecting the community's customs and sustenance. After consultation with the Mennonite community, it was mutually agreed upon to modify transmission line location and to provide financial compensation to the community where line relocation was not viable. Moreover, local population and the majority of affected landholders, whose transmission lines cross private property, supported the Norte Grande Electricity Transmission Program. The regional communities understand the benefits of economic development stimulation by having access to reliable and efficient electricity at reduced costs. Successful communication and coordination with local authorities occurred where the mitigative reforestation program was in conflict with landholder/agricultural goals and alternate areas for reforestation were located.
	Source	-Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, 22 September 2015. -IDB. Informe de Gestión Ambiental y Social, ESMR, Programa de Interconexión Eléctrica del Norte Grande (March 2006), 45-46. -Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto -Ambiental Interconexión NEA-NOA, Plan de Gestión Ambiental y Mitigación (March 2006), 215. -IDB. Informe de Supervisión Ambiental Argentina: Transmisión Eléctrica para el Norte Grande (7 August 2009), 3. -IDB. Informe de Supervisión Ambiental Argentina: Transmisión Eléctrica para el Norte Grande (06 April 2011), 3. -Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía, Comité de Administración, Fondo Fiduciario para el Transporte Eléctrico Federal. Atenuación del Impacto Ambiental Interconexión NEA-NOA 500 kV, (n.d.), 89.
	Recommendations	The NEA program reduced a majority of adverse impacts while stakeholders maintained their strong engagement and other stakeholders in the project's direct area of influence were involved in the public consultation process. Further evidence for community acceptance and involvement in design and application processes, as well as for the project's recognition and improvement of social and economic framework in communities, would support evaluation toward a higher level of achievement.

	Score	NGETP - NORTHEAST SECTION (NEA)
QL1.2 STIMULATE SUSTAINABLE GROWTH & DEVELOPMENT	13	**Conserving**
		Reinforcement of the national electricity transmission system through the NEA-NOA program will support socioeconomic development in the region, a necessary requisite towards poverty alleviation. The program is also anticipated to reduce economic disparity between the Norte Grande region and other areas of the country. The program will satisfy regional energy demand at a lower cost with better efficiency and transmission reliability. Therefore, a significant improvement in the quality of life and socioeconomic conditions of the communities affected by NEA is expected upon completion of the remaining regional transmission lines from the associated substations. Approximately 90% of the program's employees and contracted workers were sourced from within the region and local communities during both the construction and operational phases with direct employment reaching its maximum during the construction period. Additionally, indirect opportunities were created through support services by local communities; increasing the number of employed workers in the area. During the operation phase, direct employment was reduced as a result of partial system automation and selected operations being remotely controlled from Rosario, Santa Fe, Argentina. In relation to the long-term job market in the region, the transmission program expects to attract industry, businesses, and workers with increasing economic opportunities and enhancing productivity. Also the delivery of electricity improves life conditions. The program will improve energy accessibility by lowering costs and providing more capacity to the existent electrical system. Moreover, additional programs are considered to enhance livability and quality of life of the affected communities. These programs include donations to local schools and municipalities, improvements to existing access roads and other regional infrastructure, and property owner compensations, which contribute to local economic improvement. Additionally, regional economic stimulation comes from creating new jobs related to the reforestation program.
	Source	- IDB. Informe de Supervisión Ambiental Argentina: Transmisión Eléctrica para el Norte Grande (23 April 2012), 2, 3, 7. - Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, 22 September 2015. - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV, (March 2006), 94. - IDB. Informe de Gestión Ambiental y Social, ESMR, Programa de Interconexión Eléctrica del Norte Grande (March 2006), 13, 40. - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with Zofnass Team, (27 January 2016) - Ente Regulador de Electricidad de Argentina. Llamado AP NEANOA (25 October 2005), 1-7.
	Recommendations	In order to achieve a rating of "Restorative" for stimulating sustainable growth and development, it is recommended that the Norte Grande Electricity Transmission Program identify additional community areas in need of reforestation, as well as other programs that will address cultural, social and recreational resources, in addition to economic needs.

	Score	NGETP - NORTHEAST SECTION (NEA)
QL1.3 DEVELOP LOCAL SKILLS AND CAPABILITIES	2	**Enhanced**
		The intent of this subcategory is to expand the knowledge, skills, and capacity of the community workforce to improve their ability to grow. The Norte Grande Electricity Transmission Program has contributed to local employment and training primarily on a need basis during the construction period and to a minimal extent in the operational phase. Programs are designed to expand the skill levels of local employees and community members as well as to provide specialized education. The reforestation program involves training local community members. A regional workshop was held on the value of native forests in which various government representatives, including 20 teachers and 300 students were in attendance. Additionally the campaign, "Our Trees…Our Future" was launched in accordance with municipal partnership programs in reforestation and community outreach named "A Tree for Every Child" and "Caring for Urban Trees". The hiring process of skilled employees was overseen by contractors who most often sourced members from outside of local communities, based on availability of skilled labor sources. Local hiring practices focused on unskilled labor sources and a 70% quota of local-sourced labor policy in accordance to Argentine law. As such, remuneration levels differs and provokes dispute between skilled and unskilled laborers.
	Source	- IDB. Informe de Gestión Ambiental y Social, ESMR, Programa de Interconexión Eléctrica del Norte Grande (March 2006), 12. - IDB. Informe de Supervisión Ambiental Argentina: Transmisión Eléctrica para el Norte Grande (23 April 2012), 7. - Ministerio de Planificación Federal, Inversión Pública y Servicios. Plan de Reforestación NEA-NOA (18 July 2012), 6-7. - Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, 22 September 2015. - Alejandro Fros. (ENE/CAR), Juan Carlos Páez Zamora (VPS/ESG) et al. Reporte de Misión, Misión de Supervisión Ambiental AR-L1021 (26-31 May 2009), 5-6.
	Recommendations	The conflict between skilled and unskilled workers highlights the importance of the shift from project-based operations to community-based operations, which address local employment, training and worker education needs in all skill levels. Additionally, programs that attend to the most disadvantaged community groups through capacity-building systems support and prepare them for future long-term employment opportunities in new businesses. These are integral for further sustained socioeconomic development.

	Score	NGETP - NORTHEAST SECTION (NEA)
QL2.1 ENHANCE PUBLIC HEALTH AND SAFETY	0	**No Score**
		This credit takes into account the health and safety implications of new materials, technology, and methodologies beyond existing regulatory requirements. The Norte Grande Electricity Transmission Program does not employ the use of any new materials, technologies, or methodologies; therefore no special safety measures were taken into account. During the construction and operation phases of the program, the team identified potential risks to public and worker health and safety, received approvals of construction permits and safety protocols in compliance with by the Argentine governing bodies, and mitigated potential risks in accordance to regulatory requirements.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, 22 September 2015. - IDB. Informe de Gestión Ambiental y Social, ESMR, Programa de Interconexión Eléctrica del Norte Grande (March 2006), 17-19.
	Recommendations	Although new technologies and materials were not utilized for the Norte Grande Electricity Transmission Program and documentation regarding risk identification was provided, changes to the project design, methodologies, and/or protocols could be instituted to reduce risks and enhance public and worker health and safety.
QL2.2 MINIMIZE NOISE AND VIBRATION	0	**No Score**
		Appropriate and extensive studies were employed in the analysis of noise and vibration that include radio interference, audible noise, electromagnetic fields, and electrical fields under national and international regulatory guidelines. The Norte Grande Electricity Transmission Program (NEA) is currently 75% below, thus better than the maximum levels under established standards. The studies which were carried out by qualified personnel address the 500 kV electrical lines and towers, substations, and the associated lower tension lines. Proposals for the reduction of noise and vibration address both the construction and operations phases. Monitoring programs have been established and are implemented on an ongoing basis. Measures to control and reduce associated construction noise from active machinery were applied according to Argentine law, which addresses both municipal and residential zones, as well as acceptable audible noise levels for workers during shifts.
	Source	-Linsa. Plan de Gestión Ambiental y Social, ESMR, Programa, Etapa de Construcción, Interconexión LEAT 500kV NEA-NOA, Tramo Este (13 February 2009), 44-48. -Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, 22 September 2015. -Ministerio de Planificación Federal, Inversión Pública y Servicios. Atenuación del Impacto Ambiental, Interconexión NEA-NOA (n.d.), 71-72
	Recommendations	Creating a quieter community after the construction and implementation of the Norte Grande Electricity Transmission Program would qualify the project for a restorative credit. Documentation covering baseline, and current noise and vibration levels to gauge the program's results results are necessary in order to determine noise and vibration levels prior to, and post-program implementation. If levels are substantially lower than previous levels as a result of this project, a quieter community would be created and a restorative credit could be awarded.

	Score	NGETP - NORTHEAST SECTION (NEA)
QL2.3 MINIMIZE LIGHT POLLUTION	0	**No Score**
		The intent of this credit is to prevent excessive glare, night-light, and skyward-directed light directed to conserve energy and reduce obtrusive lighting. Projects that are rewarded include those that: integrate alternatives to lighting sources, eliminate glare and spillage. Also, lighting devices that are friendly towards a dark sky are considered. The Norte Grande Electricity Transmission Program did not provide any elements that minimize light pollution. Measures of achievement for safety were minimally met and did not extend beyond site boundaries.
	Source	Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 30-31.
	Recommendations	In order to achieve a minimum rating under this credit, documentation of assessments for project lighting requires with attention to preventing light spillage and glare, as well as energy efficiency measures. In order to reach a higher level of achievement, the use of non-lighting alternatives, removal of unnecessary lighting, and limiting lighting in sensitive environments in consideration of preserving the night sky darkness needs to be considered.
QL2.4 IMPROVE COMMUNITY MOBILITY AND ACCESS	4	**Enhanced**
		This credit addresses community well-being through project design and construction considerations aimed to ease traffic congestion and improve mobility and access. The design of the project aims to avoid urban congestion, especially near urban centers and transportation hubs. The Norte Grande Electricity Transmission Program addresses thoroughfare traffic flow, reduced congestion, and community livability by using existing access roads and promoting nearby community use of those roads. As a result, industrial centers and other transportational infrastructure such as airports and highways were able to be eased of heavy traffic flow. In addition to facilitating construction and site accessibility, existing roadways were upgraded, eliminating need for future unplanned urban sprawl. As these topics of importance were considered, program design successfully accomplishes improvement in community mobility and access.
	Source	- Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 32 - IDB. Informe de Gestión Ambiental y Social, ESMR, Programa de Interconexión Eléctrica del Norte Grande (March 2006), 13. - Ministerio de Planificación Federal, Inversión Pública y Servicios. Atenuación del Impacto Ambiental, Interconexión NEA-NOA (n.d.), 57-58.
	Recommendations	Attaining a higher level of achievement in is this credit implies further strategies to improve ease of access, traverse times and walkability as well as user safety in any transportational mode related to the program. Additional documentation including notes of meetings with manager and operators of adjacent facilities that address mobility matters during construction and operations would contribute to this credit goal as well. Documentation of specific methods of community mobility and improved safety during the design, construction, and implementation periods would also improve the rating. In the case that the project sites are not located near existing public transportation, linking site access to public transport rather than introducing additional motorized vehicles can be considered.

	Score	NGETP - NORTHEAST SECTION (NEA)
QL2.5 ENCOURAGE ALTERNATIVE MODES OF TRANSPORTATION	0	**No Score**
		This credit analyzes the extent to which the project has increased walkability, public transi and non-motorized transit. It is important to integrate the completed project to an existing public transportation network and foresee potentially practical improvements. In the case o the NEA, where worker transportation was provided to and from project sites, nc documentation addressing alternative transportation modes was provided. Thi transportation was not open to public use, but exclusively for workers during the construction phase.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, 22 September 2015. - Roberto Moreno Leiva. Comité de Administración del Fondo Fiduciario para el Transporte Eléctrico. "Anexo V - Especificaciones Ambientales y Sociales, LEAT y EETT de la Interconexión", (10 August 2015), 28.
	Recommendations	Although pedestrian accessibility is in the direct area of influence of the transmissior line, alternative programs focused on enhancements of public transportatior systems or promoting alternative, non-motorized transportation options could be identified and implemented as part of the mitigation considerations to improve the overall livability of communities in the region.
QL2.6 IMPROVE SITE ACCESSIBILITY, SAFETY & WAYFINDING	12	**Conserving**
		The Norte Grande Electricity Transmission Program provides very clear documentation o the requirements associated with this credit; all measures are in compliance with Argentin law. The subcontracts specify obligatory compliance with matters associated with sit accessibility, safety, wayfinding, and other operational activities. Argentine law stipulates that the contractors are required to have trained personnel on-site. The project team ha delineated and developed appropriate, and intuitive signage for safety and wayfinding fo workers and surrounding communities. The signage is comprehensive in its use of colors materials, illumination, symbols, proper installation, and location in order to ensure ease fo user accessibility and benefit. Site accessibility and safety methodologies were implemented for project workers both on, and off-site, which included signage clarity simplicity and readability. Additionally, programs were implemented in populated areas an neighborhoods within the local communities to address public health and safety, security traffic circulation, and emergency response.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, 22 September 2015. - Ministerio de Planificación Federal, Inversión Pública y Servicios. Atenuación del Impacto Ambiental, Interconexión NEA-NOA (n.d.), 59-65.
	Recommendations	It is recommended that in order to achieve a higher level of achievement in this category, project implementation should include modifications to improve a widespread, net-positive impact on public safety that extends beyond the project, in order to restore and improv long-term access and community safety. In addition, documentation delineating the plan and integration process for an overall community restoration, including additiona environmental and cultural resources, would be favorable.

	Score	NGETP - NORTHEAST SECTION (NEA)
QL3.1 PRESERVE HISTORIC AND CULTURAL RESOURCES	0	**No Score**
		This credit chapter focuses on preservation and restoration of significant historical and/or cultural resources. The Norte Grande Electricity Transmission Program Northeast Section (NEA) completed specific studies to determine areas in which the project would have an impact on historical and cultural resources through area analyses and stakeholder engagement programs. Specified methodologies for required actions to take place in the event that historical, archeological or paleontological resources are discovered anytime during the program are identified, primarily during clearing of vegetation and debris for construction. Although transmission lines and substations avoid sensitive historical and cultural areas, any subsequent discovery requires delineated processes for compliance, including a halt to operations, notification of designated public authorities for further investigation, and use of qualified personnel for further investigation. The Northeast section is an area of low risk for archeological and paleontological resources. However, as some structures are clearly stipulated in the event of discovery. Cultural objects of discovery include historical, religious, traditional customs. Program contractors are under obligation to minimize any adverse impacts in project development, as was accomplished with the Mennonite community in Santiago del Estero where compensation was provided and the transmission line route was adjusted in order to preserve community livability.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, 22 September 2015. - Ministerio de Planificación Federal, Inversión Pública y Servicios. Atenuación del Impacto Ambiental, Interconexión NEA-NOA (n.d.), 38, 66 - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA (March 2006), 246 - Ministerio de Planificación Federal, Inversión Pública y Servicios. Atenuación del Impacto Ambiental, Interconexión NEA-NOA (n.d.), 38 - IDB. Informe de Supervisión Ambiental Argentina: Transmisión Eléctrica para el Norte Grande (06 April 2011), 3
	Recommendations	Further efforts need to be taken to enhance existing historic and cultural resources by working with preservationists and focusing on the feasibility of potential rehabilitation of any resources in disrepair. Implementation of programs that match stakeholder needs with project-based upgrades of any associated recreational and educational facilities in marked communities is also recommended.

	Score	NGETP - NORTHEAST SECTION (NEA)
QL3.2 PRESERVE VIEWS AND LOCAL CHARACTER	11	**Conserving**
		Towers, cables, conductors, access roads, and right of ways from high-tension electrical lines create visual impacts; these effects can be visible from many kilometers away. Visual impacts from electricity transmission infrastructure projects can be lessened in certain situations, however eradication is not possible. Under the classification of this metric, an objective of the Norte Grande Electricity Transmission Program was to minimize the visual impact of the transmission lines and substations. Although transmission lines visually impact community landscape views, it was determined that the majority of the areas with visual impacts from the NEA are located at crossing points of low-transit, provincial and national thoroughfares; areas where lines approach populated zones; and in areas slated for rural electrification. Rural landscapes constitute the bulk of affected areas, therefore the visual impact of the program was considered to be insignificant. Program documentation made available concerning this credit addresses the goal of minimizing visual effects, as well as the extensive reforestation initiative where efforts were made to help preserve views and local character.
	Source	- Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. EIA. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV. (March 2006), 17 - Ibid., 173-174 - Ministerio de Planificación Federal, Inversión Pública y Servicios. Atenuación del Impacto Ambiental, Interconexión NEA-NOA (n.d.), 37-38 - Ministerio de Planificación Federal, Inversión Pública y Servicios. Plan de Reforestación NEA-NOA (18 July 2012), 4-5
	Recommendations	The improvement of comprehensive policies, regulations, and guidelines in accordance with the preservation of high-value landscapes as a result of the program would help to further identify community views. The program could also contribute to improving the local character of the natural landscape or urban fabric through restorative actions beyond the reforestation program.
QL3.3 ENHANCE PUBLIC SPACE	6	**Superior**
		The improvement of existing public space that includes parks, plazas, recreational facilities, or wildlife refuges to enhance community livability is the focus of this credit. The northeast section of the Norte Grande Electricity Transmission Program (NEA) has contributed positively to the local public space through its reforestation program. Moreover, the project design is focused on the enhancement of existing public spaces. Stakeholders and municipalities were actively engaged regarding the tree planting program within public spaces and schools in the communities affected by NEA. Nurseries were established for tree donations to local municipalities, and to reforest areas directly affected by the clearing of vegetation and debris on both private and public lands. Additionally, extensive efforts were made in subsequent location modifications to the initial reforestation program plans in order to align with new requests from local agricultural operations and smallholder farmers in specific areas. The requests were to move locations of designated tree planting operations of endemic flora away from newly productive agricultural areas. As such, the revised project design focused on the enhancement of existing public spaces and vegetative restoration for the benefit of the general community population

	Score	**NGETP - NORTHEAST SECTION (NEA)**
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, 22 September 2015. - Ministerio de Planificación Federal, Inversión Pública y Servicios. Plan de Reforestación NEA-NOA (18 July 2012), 6 - IDB. Informe de Supervisión Ambiental Argentina: Transmisión Eléctrica para el Norte Grande (23 April 2012),
	Recommendations	A higher rating for this credit can be achieved by implementing programs focus on the creation of new public spaces, and enhanced recreational facilities on existing public spaces, both demonstrating improved access for current and future users.
QL 4.1- IDENTIFY AND ADDRESS THE NEEDS OF WOMEN AND DIVERSE COMMUNITIES (INDIGENOUS OR AFRO-DESCENDANT PEOPLES)		**Enhanced**
		The improvement of the quality of life of women and diverse groups living in the surrounding communities, and the steps taken to assess and include these groups in the program design, construction and implementation are all considered for this credit. The northeast section of the Norte Grande Electricity Transmission Program (NEA) provided evidence of specific measures taken to address women's needs associated with employment opportunities, and, diverse communities of the indigenous Toba community in the province of Formosa and the Menonite community in Santiago del Estero during program implementation and execution. The contractor's contract stipulates the mitigation of any adverse effects to the diverse communities according to data published by the National Census of Indigenous Peoples (Censo Indígena Nacional), the Toba community is fully integrated into the urban landscape, and has verified its acceptance of the electricity transmission program. Nonetheless, program measures were still designed according to the World Bank guidelines for implementation, which included public consultations with Toba members, monthly monitoring of the program, and preferences for hiring individuals from the Toba community. As part of a program for the protection of diverse communities, the Menonite community was consulted with in order to mitigate undesired disruptive activities and line placement in the community that would adversely impact the group's living environment. Both parties, through public consultation, agreed upon line relocation and monetary compensation.
	Source	- Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV, (March 2006), 10, 248-249 - LINSA. NPOBR-ES-0080. Resistencia – Chaco. 13 October 2009. - LINSA. Plan de Gestión Ambiental. Etapa de Construcción. Interconexión LEAT 500kV NEA-NOA, Tramo Este (13 January 2009), 78. - Decreto Nacional 1.426/92 Creación del Consejo Nacional de la Mujer. (7 March 1991), 1 - Cuestionario sobre la Aplicación de la Plataforma de Acción de Beijing (1995) y los resultados del vigésimo tercer período extraordinario de sesiones de la Asamblea General. (30 April 2004), 1-3, 14 - Ley Nacional 24.012 Argentina. "Cupo Femenino Código Electoral Nacional Sustitución del Art. 60 del Decreto 2135/83 (n.d), 1-3.

	Score	NGETP - NORTHEAST SECTION (NEA)
QL4.2 - STIMULATE AND PROMOTE WOMEN'S ECONOMIC EMPOWERMENT	Recommendations	Although one indigenous community was identified and engaged by the NEA team, a substantially more comprehensive assessment of the needs of women, in order to improve their quality of life is recommended. Documentation of greater attention being given to diverse communities and gender considerations; which include the development, implementation, and monitoring of appropriate gender-sensitive and indigenous-sensitive health and safety protocols and programs would improve the rating for this credit.
	0	**No score**
		This credit targets women's economic empowerment through sustainable livelihoods, local procurement, job creation, capacity building, and training programs. Achievement is measured based on the extent to which a project impacts women's livelihoods and capabilities. Projects that outline targeted recruitment to create jobs and work programs, and further identify and source from women-led companies achieve higher scores for this credit. The program respects Argentine law in supporting women's economic empowerment by assuring that a 30% minimum of employees and workers are women throughout all development and operational phases. Moreover as specified by Argentine equal opportunity policies, training programs specific to women, employment diversification prospects and programs to support women-led opportunities are realized in the program.
	Source	- Institute for Sustainable Infrastructure, Zofnass Program. "Gender and Diversity Credits Report," IDB (2015) - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with Zofnass Team, (27 January 2016). - Decreto Nacional 254/98 Argentina Plan para la Igualdad de Oportunidades entre Varones y Mujeres en el Mundo Laboral. "Artículo 75, Inciso 22, de la Constitución Nacional y las Leyes 23.451 y 24.632, Argentina," (n.d.), 2. - Ley Nacional 25.674 Argentina. "Participación Femenina en las Unidades de Negociación Colectiva de las Condiciones Loborales, Cupo Sindical Femenino," (n.d.), 1-2. - Decreto Nacional 1.426/92 Creación del Consejo Nacional de la Mujer. (7 March 1991), 1 - Cuestionario sobre la Aplicación de la Plataforma de Acción de Beijing (1995) y los resultados del vigésimo tercer período extraordinario de sesiones de la Asamblea General. (30 April 2004), 1-3, 14 - Ley Nacional 24.012 Argentina. "Cupo Femenino Código Electoral Nacional Sustitución del Art. 60 del Decreto 2135/83 (n.d), 1-3.
	Recommendations	Plans and commitments explaining benefits for local women, women's empowerment, and the hiring of women that exceed Argentine requirements could be provided. These observations apply to the project, and/or to partnerships and agreements with relevant stakeholders. Submission of documented explanations addressing processes to identify women's employment and training needs, and an understanding of the manners in which the project will benefit local women, with regards to livelihood, economic opportunities, and capabilities would improve the ranking for this category.

	Score	NGETP - NORTHEAST SECTION (NEA)
QL4.3 - IMPROVE ACCESS AND MOBILITY OF WOMEN AND DIVERSE COMMUNITIES (INDIGENOUS OR AFRO-DESCENDANT PEOPLES)	0	**Enhanced**
		The intent of this credit is in assessing project location, design, and associated access and mobility needs for women and marginalized social groups, and the degree to which these metrics can be improved within the project scope and associated initiatives. Women and diverse groups often lack access to decision making channels, resources, land ownership, employment, and technical training. For this reason, identification and assessment of the needs and constraints of marginalized groups, to enable them to benefit from opportunities provided by the infrastructure project is valuable for this credit.
	Source	- Institute for Sustainable Infrastructure, Zofnass Program. "Gender and Diversity Credits Report," IDB (2015)
	Recommendations	Documented considerations of project strategies and program incorporation of actions that provide safe and affordable access to facilities, amenities, and transportation hubs for women, children, and diverse community members would improve the rating for this credit. Any substantive changes to the project design that facilitate better healthcare, schooling, and job availability through improved access and mobility for women and diverse groups, should be considered and documented.
QL0.0 INNOVATE OR EXCEED CREDIT REQUIREMENTS	0	N/A
	77	

SUB CATEGORY: LEADERSHIP		
	Score	**NGETP - NORTHEAST SECTION (NEA)**
LD1.1 PROVIDE EFFECTIVE LEADERSHIP AND COMMITMENT	10	**Enhanced**
		This credit supports demonstration of effective leadership and meaningful commitment of the project team aligned with the principles of sustainability and sustainable performance improvement. Analysis of the project leadership's commitment measures attainment of sustainability goals. As the Norte Grande Electricity Transmission Program is overseen by Argentina's Comité de Administración del Fondo Fiduciario para el Transporte Eléctrico Federal (CAF), the organizational structure for federal electrical infrastructure projects dictates CAF to direct and verify all sustainability-related matters related to environmental, social and economic analyses. While limited documentation evidences the project's commitment to sustainability goals and policies, CAF and project contractors associated with public consultation and community programs demonstrate the project's responsibility towards sustainable organizational strategy. Moreover, successful implementation of the reforestation program provides a tangible example of the achievement of the sustainability goals. However, even though the program develops in the EIA a list of related environmental, economic and societal aspects, its is unclear how these priorities are materialized in specific commitments to improve the overall sustainable performance and goals of the organization.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (30 September 2015). - IDB. Reglamento Operativo, Programa de Transmisión Eléctrica Norte Grande Informe (14 July 2006), 31-33 - Ministerio de Planificación Federal, Inversión Pública y Servicios. Plan de Reforestación NEA-NOA (18 July 2012), 5-9 - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. EIA. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Federal de Transporte 500 kV. (March 2006)
	Recommendations	Demonstration and evidence of the commitment to economic, environmental and social performance across the project team through clearly defined core values, policies and organizational structure would enhance the rating in this section. Policies to develop written, public commitments by all parties associated with the project on the organization's alignment to improved goals in sustainable performance is suggested. Demonstration and evidence of the commitment to economic, environmental and social performance across the project team through clearly defined core values, policies and organizational structure would enhance the rating in this section. Policies to develop written, public commitments by all parties associated with the project on the organization's alignment to improved goals in sustainable performance is suggested. Besides, the sustainability performance of the organization should be reported regularly through annual reports.

	Score	NGETP - NORTHEAST SECTION (NEA)
LD1.2 ESTABLISH A SUSTAINABILITY MANAGEMENT SYSTEM	13	**Conserving**
		Creation and implementation of a project management system that can manage project complexities through business processes, organizational policies, and other mechanisms is analyzed. While not enough evidence rests under the idiom of sustainability management system, the Norte Grande Electricity Transmission Project has clearly defined mechanisms that are adequate for the scope, scale and complexity of the project toward sustainable performance. Project roles are clearly assigned from the Fiduciario para el Transporte Eléctrico Federal (CAF) through the contractor agreements in construction and operation phases with strict adherence to Argentine law. Commitment to exceeding select sustainability goals has been demonstrated through the NEA reforestation program; examples include surpassing the required levels of reforestation, training local residents of reforestation initiatives, and raising employment opportunities in tree nurseries. The project's ability to address change through reforestation programs responds to local farmer requests for relocation of programmed tree planting in order to utilize cleared land for agriculture; identified alternative zones include public spaces in local municipalities. Additionally, responsibilities for sustainable performance concerns are delegated, primarily founded on the Environmental Impact Analysis (EIA) and subsequent monitoring programs. The project teams have demonstrated assessment and prioritization of environmental, social and economic aspects in the transmission program, and have developed plans and processes to manage the project accordingly through organizational methodologies
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (30 September 2015) - Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social), Organigrama NEA NOA a UESTY (n.d.), 1 - Ministerio de Planificación Federal, Inversión Pública y Servicios. Plan de Reforestación NEA-NOA (18 July 2012), 7-8 - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Gestión Ambiental y Mitigación, (March 2006), 185-189
	Recommendations	Advice is given towards formation and publication of multiple organizational policies as well as mechanisms and business processes that address potential uncertainties by changing conditions and other fluctuating variables. Establishment of an autonomous sustainability management system for the Norte Grande Electricity Transmission Program is aligned with program goals, targets and sustainable performance. In addition, increasing the robustness of the management system and control mechanisms is recommended in order to handle unexpected events. Advice is given towards formation and publication of multiple organizational policies as well as mechanisms and business processes that address potential uncertainties by changing conditions and other fluctuating variables. Establishment of an autonomous sustainability management system for the Norte Grande Electricity Transmission Program is aligned with program goals, targets and sustainable performance. In addition, increasing the robustness of the management system and control mechanisms is recommended in order to handle unexpected events.

	Score	NGETP - NORTHEAST SECTION (NEA)
LD1.3 FOSTER COLLABORATION AND TEAMWORK	10	**Enhanced**
		This credit supports demonstration of effective leadership and meaningful commitment of the project team aligned with the principles of sustainability and sustainable performance improvement. Analysis of the project leadership's commitment measures attainment of sustainability goals. As the Norte Grande Electricity Transmission Program is overseen by Argentina's Comité de Administración del Fondo Fiduciario para el Transporte Eléctrico Federal (CAF), the organizational structure for federal electrical infrastructure projects dictates CAF to direct and verify all sustainability-related matters related to environmental, social and economic analyses. This credit evaluates a systematic design approach to eliminate conflicting design elements of a project and to deliver methodologies towards integration and collaboration. Measurement assesses the extent of collaboration within the project team and the degree to which project delivery processes incorporate a comprehensive systems design and delivery approach. The Norte Grande Electricity Transmission Program has approached project development, to some extent, as a set of interconnected systems through the utilization and improvement of previously existing transportation systems. They have also incorporated project leadership in the planning stage through contractor specifications while simultaneously addressing the context of community. The project team recognizes the need for collaborative management processes between regulatory bodies and contractors for a project's success and performance. Rubrics of processes, procedures, and guidelines towards improving sustainable performance are well documented. In addition, some evidence confirms control measures have been developed under contractor commitments to find solutions for potential complications. However, design considerations that minimize sources of demand or eliminate unnecessary redundancies, and evidence of project team risk and reward sharing remain to be evident.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (30 September 2015). - Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social), Organigrama NEA NOA a UESTY (n.d.), 1 - Ministerio de Planificación Federal, Inversión Pública y Servicios. Atenuación del Impacto Ambiental, Interconexión NEA-NOA (n.d.), 6-8, 42-43
	Recommendations	Integration of a whole-systems design approach in the project would help optimize the system and eliminate conflicting design elements. The incorporation of innovative collaborative methodologies that explicitly share risks and rewards between the owner's and design team beyond legal Argentine requisites is recommended towards improving additional sustainable performance.

	Score	NGETP - NORTHEAST SECTION (NEA)
LD1.4 PROVIDE FOR STAKEHOLDER INVOLVEMENT	13	**Conserving**
		The Norte Grande Electricity Transmission Program NEA has developed extensive and ongoing stakeholder engagement programs throughout the three project phases: planning, construction and operation. Public consultation programs with affected communities and relevant groups establish lines of communication through publications and web-based media. The programs allow for informational transfer and feedback. A stakeholder's ongoing involvement in the reforestation program incorporates local municipalities and communities through two-way communication, donations, employment and education programs. Upon determination of community disagreements, further engagement procedures were implemented in both public and target community forums to achieve solutions. Examples that demonstrate specific and significant changes to the project based on feedback received include: the transmission line route modifications in the Mennonite community of Pampa de los Guanacos in the province of Santiago del Estero in order to preserve its cultural, religious and sustenance traditions, as well as in agricultural communities where farmers adopted expanded agricultural practices in areas slated for reforestation.
	Source	- IDB. Informe de Gestión Ambiental y Social, ESMR, Programa de Interconexión Eléctrica del Norte Grande (March 2006), 45-51 - LINSA. Plan de Compensación Forestal (6 June 2011), 2-3, 5-8 - IDB. Informe de Supervisión Ambiental Argentina: Transmisión Eléctrica para el Norte Grande (23 April 2012), 2-3 - Ibid., (25 June 2010), 3
	Recommendations	Preservation of permanent stakeholder involvement practices between the project's operators and stakeholders. It focuses on not only obtaining meaningful input, but also accepting that the process for the making project decisions is fair and equitable for all parties involved
LD2.1 PURSUE BY-PRODUCT SYNERGY OPPORTUNITIES	13	**Conserving**
		The purpose of this credit is to locate opportunities to reduce waste, improve performance and optimize costs through the use of unwanted by-products or discarded materials and resources from operations and facilities located near the project. Detection and implementation of by-product synergies can build long-term relationships across project sectors and improve the environmental footprint of an operation through the principles of industrial ecology. The Norte Grande Electricity Transmission Program did not contemplate opportunities to obtain by-products or discarded materials and resources from nearby operations or facilities in the design, construction and operational phases. The pursuit of by-product synergies toward making use of those materials was not assessed.

	Score	NGETP - NORTHEAST SECTION (NEA)
	Source	- Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 58-59
	Recommendations	Include efforts to identify and characterize by-product materials in nearby facilities are the advised first steps. Future assessments during the operational period to locate materials required in any of the associated programs within the project scope, and, relationship building with those facilities is recommended.
LD2.2 IMPROVE INFRASTRUCTURE INTEGRATION	7	**Superior**
		The extent to which the project integrates its delivered works with other elements of community infrastructure in both existing and planned programs is measured. Considering its large regional scale, the NEA-NOA program integrates the national electricity grid by connecting the northern region to the rest of the country, generating greater regional economic development opportunities as well as improved service and efficiency. The program also augments potential for international electricity transmission. At the local scale, the Norte Grande Electricity Transmission Program has made efforts to eliminate design conflicts and to find systematic synergies that enhance overall infrastructure performance, primarily in roadways and industrial centers, advancing future development opportunities in the region. At the onset, design characteristics integrated existing infrastructure to minimize program impacts and to maximize potential benefits. Transmission lines parallel existing, nearby railroad tracks and other high tension transmission lines; project river crossings were realized at existing bridge locations, and local roadways were upgraded for utilization. Sustainability performance is project-specific and evidence was not provided for the incorporation of valuable community assets such as: knowledge and social capital toward an overall improvement in sustainable infrastructure through community-wide integration.
	Source	- IDB. Informe de Gestión Ambiental y Social, ESMR, Programa de Interconexión Eléctrica del Norte Grande (March 2006), 13, 40
	Recommendations	Additional integration with and restoration of natural systems, resources and community assets in a comprehensive plan would improve performance. Programmatic consideration of restoring community assets to optimize performance across multiple infrastructural agents will enhance a community's infrastructural efficiency related to the NEA transmission program.

	Score	NGETP - NORTHEAST SECTION (NEA)
LD3.1 PLAN FOR LONG-TERM MONITORING & MAINTENANCE	3	**Enhanced**
		This credit evaluates long-term maintenance plans and incorporation of adequate resources to ensure ecological protection, mitigation and enhancement measures. The Norte Grande Electricity Transmission Program has a clearly developed long-term monitoring and performance plans based on Argentine law, which was established prior to project completion. As the project administrator, the Fiduciario para el Transporte Eléctrico Federal (CAF) oversees inspection programs of the project. Inspection is performed on a monthly basis and granted via contract to a private entity, monitored by CAF. The monthly inspection reports address legal, environmental, social and maintenance matters as well as the effectiveness of the monitoring and supervision programs. The concessionaire contract specifies that sufficient resources be allocated for the operation and maintenance of the reconstructed works according to the information provided in the program loan proposal and the environmental and social specifications. Monitoring programs are performed in situ through a private contract. Evidence of specific resources and funds allocated for long-term maintenance was not provided however it is assumed that adequate resources will be in place for long-term monitoring and maintenance throughout the project's lifespan.
	Source	- Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (30 September 2015). - IDB. Reglamento Operativo: Programa de Transmisión Eléctrica para el Norte Grande (14 July 2006), 31-32 - IDB. Informe de Supervisión Ambiental Argentina: Programa de Transmisión Eléctrica para el Norte Grande (23 June 2010), 7-9 - Roberto Moreno Leiva, Comité de Administración del Fondo Fiduciario para el Transporte Eléctrico. "Anexo V - Especificaciones Ambientales y Sociales, LEAT y EETT de la Interconexión", (10 August 2015), 35 - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 212-214
	Recommendations	Although a maintenance and monitoring plan has been prepared, design performance needs to be maintained throughout the design life of the project. Further explanation of funding details toward resource allocation should be provided.

	Score	NGETP - NORTHEAST SECTION (NEA)
LD3.2 ADDRESS CONFLICTING REGULATIONS & POLICIES		0 **No Score**
		This credit details collaboration with officials to identify and address laws, standards, regulations or policies that may unintentionally create barriers to the implementation of sustainable infrastructure. Evaluation of the extent to which the project team has identified and made efforts to change policy, which may run counter to sustainability goals, objectives and practices, is measured to find more sustainable solutions for future infrastructure development. The Norte Grande Electricity Transmission Program complied with all laws, regulations, policies and standards in the planning, construction and operational phases. However, evidence of a systematic assessment toward an increased scope for the identification of any current laws, regulations or policies that run in conflict with future sustainable performance of infrastructure projects was not available.
	Source	- Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 64-65
	Recommendations	It is recommended that a systematic assessment identifies laws, standards, regulations or policies applicable to the project, in contribution to diminished sustainable performance. Subsequent engagement with decision-makers towards improvement of widespread structural changes need to be considered.
LD3.3 EXTEND USEFUL LIFE		0 **Improved**
		Project design that incorporates durability, flexibility and resilience to extend the project's useful life is assessed. The longer a project's life expectancy is, the less energy, water and material use is necessary per project duration because the project need not be replaced in a short span of time. While materials used in the Norte Grande Electricity Transmission Program are standardized in electricity transmission and associated substations, a marginal life-cycle approach regarding the project's ability to expand opportunities and investment in areas of long-term payback for the nation are deliberately measured in the design. The project is designed to meet Argentine standards and it has been demonstrated that the useful life can expand beyond 50 years. Evidence was not provided, however, in planning for extended durability, project resilience to extend the useful life and reduce future maintenance and ease retrofitting and repair. Project-specific future expansion opportunities and associated feasibility studies were also not available in documentation toward potential long-term cost savings associated with reconfiguration, durability and reduced maintenance.
	Source	- Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 7 - IDB. Informe de Gestión Ambiental y Social, ESMR, Programa de Interconexión Eléctrica del Norte Grande (March 2006), 9, 11.

CATEGORY I, PEOPLE AND LEADERSHIP **SUB CATEGORY: LEADERSHIP**

	Score	NGETP - NORTHEAST SECTION (NEA)
	Recommendations	In addition to extending a project's life expectancy through larger development plans of interconnection, the program's durability and resiliency is evaluated to reduce long-term natural resource use. A higher rating would be achieved if the project considered design plans that added flexibility and simple refurbishment techniques as well as more durable materials, which require less repairs and upgrades.
QL0.0 INNOVATE OR EXCEED CREDIT REQUIREMENTS	0	N/A
	35	

CATEGORY II: CLIMATE AND ENVIRONMENT

SUB CATEGORY: RESOURCE ALLOCATION

	Score	NGETP - NORTHEAST SECTION (NEA)
RA1.1 REDUCE NET EMBODIED ENERGY	0	**No Score**
		This credit addresses the need to reduce large amounts of energy associated with extraction, processing, manufacturing and transport of materials and components over the course of a project's lifespan, including construction, operation, and maintenance. An estimate net embody energy of project materials is required, carried out by means of a life cycle assessment (LCA). The Norte Grande Electricity Transmission Program has not presented evidence of a LCA in relation to net embodied energy use of the project materials or approaches for embodied energy reductions in sourced materials compared to industry norms.
	Source	- Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 74-75.
	Recommendations	Advancement toward higher levels of achievement in net embodied energy reduction through by conducting a LCA in accordance with recognized and accepted methodologies is recommended. Design documents should demonstrate reduced quantity of materials utilized with lower embodied energy.
RA1.2 SUPPORT SUSTAINABLE PROCUREMENT PRACTICES	0	**No Score**
		This credit addresses project material and equipment procurement from manufacturers and suppliers that implement sustainable practices toward protecting human health and the environment. Material consideration includes supplies that do not use hazardous, toxic or volatile organic compounds, as well as materials with recycled content and others that do not contain excess packaging to minimize energy and water use. Additional considerations include procured materials that utilize renewable energy, reducing greenhouse gas emissions in a project's supply chain. The program did not provide documentation of sustainably-sourced product procurement practices or evidence of supplier tracking methods that consider source materials. The Norte Grande Electricity Transmission Program requires that contractor procurement practices comply with ISO 9000, ISO 14000 and IRAM certification for all project equipment and material according to the Comité de Administración del Fondo Fiduciario para el Transporte Eléctrico (CAF). Additional documentation however is necessary to stipulate percentages of material and equipment purchases from those manufacturers and suppliers that follow sustainable practices in addition to supplier tracking methods that consider source materials.
	Source	- Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 76-77 - LINSA. Plan de Gestión Ambiental. Etapa de Construcción. Interconexión LEAT 500kV NEA-NOA, Tramo Este (13 January 2009), 132. - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with Zofnass Team, (27 January 2016).

	Score	NGETP - NORTHEAST SECTION (NEA)
	Recommendations	Project methodologies, policies and targets that establish supplier criteria for sustainable procurement practices is advised for improvement in this credit. Further evidence is necessary in the selection and monitoring of the program's supply chain that includes total weight and volume of procured materials and inventory of suppliers that address environmental and social criteria.
RA1.3 USED RECYCLED MATERIALS	0	**No Score**
		The purpose of this credit is to reduce natural material use and to avoid sending useful materials to the waste stream by incorporating reused materials and products with recycled content in an infrastructure project. The reduction of virgin material uses minimized waste, embodied carbon emissions and environmental degradation as well as recycled and reused materials. The Norte Grande Electricity Transmission Program did not provide evidence of evaluation and inclusion of recycled material in the construction or operational phases of the project.
	Source	- Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 78-79
	Recommendations	Improve efforts and policies to specify reclaimed and recycled materials use, as well as, the reuse of any existing structures to increase recycled content percentages.
RA1.4 USE REGIONAL MATERIALS	6	**Enhanced**
		The use of regional materials in the construction and operation of a project can minimize transportation costs and impact as well as retain regional benefits. Because the transportation of materials and products is a significant source of greenhouse gas emissions and other pollutants, the use of regional materials and materials produced on site can mitigate adverse environmental impacts and support local and regional economies. To fulfill this credit, materials are sourced within specified distances: soils (80 km); aggregate (80 km) concrete (160 km); plants (400 km); and other materials excluding equipment (800 km). Initially, according to the team, the Norte Grande Electricity Transmission Program utilizes between 70% to 100% of regionally-sourced materials and other equipment in the construction phase. However, further documentation would support the evaluation of materials locally sourced. The Argentine law requires contractors to purchase locally sourced materials when practicable via the program Compre Nacional / Compre Trabajo Argentino.

	Score	NGETP - NORTHEAST SECTION (NEA)
	Source	- Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (8 October 2015) - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 175, 186 - "Régimen de Compras del Estado Nacional y Concesionarios de Servicios Públicos, Compre Trabajo Argentino," Ministerio de Economía y Finanzas Públicas Argentina. Accessed 16 October 2015 http://www.mecon.gov.ar/digesto/leyes/ley25551.htm. - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with Zofnass Team, (27 January 2016).
	Recommendations	Additional documentation on the quantity, type and distances of materials locally sourced would benefit this credit evaluation. For a higher level of achievement, a documented increase in regionally-sourced materials for construction include soils, aggregates, concrete, and plants is required for the project. Other materials sourced in site or within a radius of 800 km, excluding equipment, can also be considered as regional material use.
RA1.5 DIVERT WASTE FROM LANDFILLS	0	**Improved**
		The intent of this credit is to reduce the quantity of waste generated by the completed project and to determine the percentage of waste diverted from disposal for recycling and reuse. An operations waste management plan that considers a minimum of 25% of the total recycled waste is necessary to reach minimum achievement. The Norte Grande Electricity Transmission Program applied a waste management plan for both organic and inorganic materials during the construction period in accordance to Argentine law. According to the team, 100% of organic materials during vegetation clearing of the easement strip were reincorporated into the soil, approximately 50% of inorganic materials were diverted from landfills and 90% of produced waste was recycled during the construction period. Besides, plastic bottles and caps were separated and donated to the Pediatric Hospital SAMIC Prof. Dr. Juan Pedro Garrahan; representing 30% of total produced residue in facilities at the constrtuction site (Obradores). As reported by the team, a 30% of materials diverted to recycling or reused that include plastics, glass, wood, cables, packaging and bottle tops was achieved during operations. Wood and cables were donated to and reused by local communities.
	Source	- Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (8 October 2015) - Roberto Moreno Leiva, Comité de Administración del Fondo Fiduciario para el Transporte Eléctrico. "Anexo V - Especificaciones Ambientales y Sociales, LEAT y EETT de la Interconexión", (10 August 2015), 13, 23 - LINSA. Plan de Gestión Ambiental. Etapa de Construcción. Interconexión LEAT 500kV NEA-NOA, Tramo Este (13 January 2009), 146. - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with Zofnass Team, (27 January 2016). - - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (1 February 2016) - CAF. Planilla Indicadores Almacenamiento Residuos Especiales (September 2015 - August. 2016).

	Score	NGETP - NORTHEAST SECTION (NEA)
	Recommendations	Although the amount of waste produced during the project's operations is minimal, it is recommended to further promote waste reduction and diversion of waste from landfills by increasing the percentage of material recycle and reuse. This includes the development of effective plans for handling, segregation, and storage of materials. It is important to identify which materials must be separated against ones that can be mixed.
RA1.6 REDUCE EXCAVATED MATERIALS TAKEN OFF SITE	4	**Enhanced**
		The reduction of offsite, excavated material transportation and other adverse environmental impacts is studied in this credit. Approximately 70% to 80% of excavated inorganic material suitable for reuse is effectively used onsite in the Norte Grande Electricity Transmission Program. The largest inorganic excavating efforts are exercised for tower foundations. Reutilization of the excavated inorganic material for tower support is applied when feasible for reduction in project material transportation expense. Approximately 95% of the organic material, consisting of primarily cleared vegetation, is incorporated onsite through soil.
	Source	- Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (8 October 2015) - Roberto Moreno Leiva, Comité de Administración del Fondo Fiduciario para el Transporte Eléctrico. "Anexo V - Especificaciones Ambientales y Sociales, LEAT y EETT de la Interconexión", (10 August 2015), 13, 23 - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with Zofnass Team, (27 January 2016).
	Recommendations	Further assessment of inorganic material reuse on site is recommended to improve performance in this credit. Additional documentation on planning and design opportunities to balance cut and fill and techniques to minimize grading in order to retain all soil onsite and other beneficial applications for on-site reuse of excavated materials is recommended.

	Score	NGETP - NORTHEAST SECTION (NEA)
RA1.7 PROVIDE FOR DECONSTRUCTION & RECYCLING	0	**No Score**
		The intent of this credit is to assess the project's encouragement toward future recycling, upcycling, and reuse through design of ease and efficiency in disassembly or deconstruction at the end of the project lifespan. Evaluation of the percentage of components that can be easily separated yield high-grade reclamation. Also, the minimization of composite forms avoid the need for component reprocessing reuse is conducted. The end of life project deconstruction was not considered in the Norte Grande Electricity Transmission Program. The project's useful life extends beyond 50 years and design stays within traditional boundaries of electricity transmission norms regarding materials, components and equipment.
	Source	- Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (8 October 2015) - Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 86-87
	Recommendations	Expansion of the project scope to include more life-cycle elements beyond construction and functionality that incorporates enhanced flexibility toward increasing possible component use in the future is recommended. Attention to components that have been designed for disassembly and reuse, as well as recyclable materials should be considered. These considerations can be integrated in the complementary facilities of the program.
RA2.1 REDUCE ENERGY CONSUMPTION	0	**No Score**
		Energy consumption conservation in the operational and maintenance phases of the project are assessed and percentages of energy reduction are measured in this credit. A whole-systems design approach toward considering emissions as well as multiple benefits from a single investment may be applied. Calculation of annual energy consumption during operations toward energy reductions above industry standards is assessed. To fulfill this credit at least 10% of operational energy reduction should be estimated when compared to industry norms. The Norte Grande Electricity Transmission Program met the basic code and regulatory requirements regarding energy consumption. The project represents an improvement in the quality of energy transmission services as well as a reduction in associated operational and maintenance costs. However, energy consumption was not factored into the overall operational or maintenance plans of the project related to evaluation of environmental loads and impacts over the life of the project.
	Source	- Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (8 October 2015) - Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 88-89 - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with Zofnass Team, (27 January 2016).

	Score	NGETP - NORTHEAST SECTION (NEA)
	Recommendations	Specific energy-efficient equipment and processes incorporating a whole-systems design approach to evaluate energy requirements and integrate strategies to reduce energy consumption. Project feasibility, cost analyses and design documents that address energy-saving methods and strategies would improve performance in this credit. Additionally, calculations of the project's energy used in comparison to industry norms and documented programs toward reductions would assist in energy reduction implementation processes.
RA2.2 USE RENEWABLE ENERGY	4	**Enhanced**
		This credit promotes the use of renewable energy sources to meet project energy needs. Renewable energy includes solar, wind, water, biomass, geothermal and hydrogen/fuel cells. Attention is paid to the documentation of the project's annual operational energy consumption by energy-source category. Minimum achievement for this credit considers at least 10% of energy from renewable resources. The Norte Grande Electricity Transmission Program uses approximately 7% renewable energy in the operational phase according to current Argentine energy generation sources. Additional considerations of on-site generation of renewable energy or fuel alternatives were not considered in the project. Besides, among the aims of the project is to improve the transmission reliability of the electricity generated by hydroelectric facilities of Yacyretá.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (8 October 2015) - Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 90-91. - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with Zofnass Team, (27 January 2016).
	Recommendations	An increase in the percentage of renewable energy sources used in the project would decrease the project's overall conventional energy demands. Documentation providing actual and projected energy use on annual bases and energy needs, categorized by source type with recognized renewable energy certificates, would provide control of requirements and resources utilized.

	Score	NGETP - NORTHEAST SECTION (NEA)
RA 2.3 COMMISSION & MONITOR ENERGY SYSTEMS	3	**Enhanced**
		Extension of the useful life of a project and efficient functioning of its energy systems with processes in place for commissioning and monitoring performance is the intent of this credit. User behavior is a primary factor in energy performance and commissioning allows systems to function from the onset of operations. Monitoring equipment provides operators the opportunity to ensure energy efficiency throughout the life of a project. The Norte Grande Electricity Transmission Program complies with Argentine regulations and follows industry norms in reference to commissioning and monitoring energy systems. Within the initial project scope, energy consumption and cost analyses were performed in order to reduce costs and address energy system performances. To facilitate long-term monitoring, the concessionaire Transnea, through its operator contract monitors energy systems in the operational phase however data of specific monitoring equipment was not available.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (8 October 2015) - Roberto Moreno Leiva. Comité de Administración del Fondo Fiduciario para el Transporte Eléctrico. "Anexo V - Especificaciones Ambientales y Sociales, LEAT y EETT de la Interconexión", (10 August 2015), 31-32 - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 186, 212, 219
	Recommendations	An extensive initial commissioning by an authority independent from the design, construction and operations team is recommended. Training personnel in monitoring energy systems and incorporating advanced monitoring systems in project design can ensure energy system performance over time. Additionally, utilization of equipment such as energy sub-meters can lead to more efficient operations and improved efficiencies in electrical and mechanical equipment.
RA3.1 PROTECT FRESH WATER AVAILABILITY		Regional water availability, quantity and quality can be affected by industrial demands through use and discharge that influence the variability of the hydrologic cycle. As a result of climate change, freshwater vulnerability can increase the effects of an infrastructure project's water consumption on regional quality and availability. The protection of groundwater and surface water in the project scope reduces negative, long-term impacts of viable water sources. The NEA program's installations are located in diverse hydrogeological areas. Monthly water quality monitoring programs are defined by the contract, which addresses total hydrocarbons, total and suspended particulate matter and conductivity for fresh water availability. Effects on existing water quality apart from select suspended solids during site clearing and construction were considered minimal. Herbicide use during site clearing was determined to affect water quality and use was not applied except for extreme circumstances. Further documentation on water management policies that address freshwater availability and usage in construction and operations was not provided.

	Score	NGETP - NORTHEAST SECTION (NEA)
	Recommendations	- Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 84-85, 212 - Ministerio de Planificación Federal, Inversión Pública y Servicios. Atenuación del Impacto Ambiental, Interconexión NEA-NOA (n.d.), 36
	Source	Estimation of average peak demands and long term needs should be assessed in relation to the project's water requirements. Comprehensive water availability assessments in conjunction with applied water management programs to achieve results of no net impact is advised. Through restorative actions of replenishing surface and groundwater volumes of estimated peak, long-term needs via recharge and design efforts to mitigate negative impacts is advised.
RA3.2 REDUCE POTABLE WATER CONSUMPTION	0	**No Score**
		The reduction of overall potable water consumption in a project's operational and maintenance phase is evaluated in this credit with the intent of reducing potable water demands through support of greywater, recycled water, and stormwater use to meet project needs. Percentage of potable water reductions is measured. Design and feasibility documents that identify and address reduction strategies as well as provide cost effective alternatives that go beyond industry norms toward net positive generation of water availability are considered. The Norte Grande Electricity Transmission Program did not provide documented verification on the consideration of strategies toward potable water consumption reduction in associated project requirements through utilization of alternative water supplies from greywater, recycled water or stormwater uses.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (8 October 2015) - Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 96-97
	Recommendations	A comprehensive planning process and sound design reviews to identify strategies for reductions in potable water consumption in the project's operations and maintenance phases that result in operational changes for alternative water sources through recycling or reuse either by the project team or through separate entities is recommended.

CATEGORY II, CLIMATE AND ENVIRONMENT **SUB CATEGORY: RESOURCE ALLOCATION**

	Score	NGETP - NORTHEAST SECTION (NEA)
RA1.7 PROVIDE FOR DECONSTRUCTION & RECYCLING	0	**No Score**
		Water system consumption monitoring during operations enables detection of flows, usages and leaks in operations that can save money and prevent unnecessary seepage that lead to waste in potable water resources and emissions associated with necessary and required water treatment and distribution. Long-term monitoring programs that gauge a project's water usage can improve sustainability goals through usage and pollution control measures. The Norte Grande Electricity transmission Program has detailed project plans and monitoring policies related to water system monitoring in riverbed areas in regards to total hydrocarbons, suspended solids, dissolved solids and conductivity in accordance to rigid Argentine regulations. The project, however, has not defined internal consumption monitoring systems concerning usage and leak detections during long-term application. While water quality assessments are conducted on weekly and monthly bases, evidence has not shown water performance systems applied during operations to include sub-meters for improved efficiencies.
	Source	- Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 84-85, 212 - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (8 October 2015)
	Recommendations	Incorporation of water consumption monitoring systems that account for long-term usage and advance the operational efficiencies will improve the project's performance on reducing negative impacts and conserving both the quantity and quality of associated regional water resources. The integration of monitoring activities with operational practices will enable the independent contractor to make necessary adjustments in order to reduce adverse impacts.
QL0.0 INNOVATE OR EXCEED CREDIT REQUIREMENTS	0	N/A
	18	

SUB CATEGORY: NATURAL WORLD		
	Score	**NGETP - NORTHEAST SECTION (NEA)**
NW1.1 PRESERVE PRIME HABITAT	18	**Restorative**
		Infrastructure projects can have adverse impacts on prime habitat areas and biodiversity, especially in project construction phases with increased noise, light, pollution, particulate matter and vegetation clearing both on and off-site areas. Preventing impacts by selecting appropriate sites during planning is most to minimize and avoid both direct and indirect adverse impacts. The electrical line placement avoided areas of high ecological value and prime habitat, and when determined necessary, design modifications adjusted line location. Direct and indirectly affected areas were maintained and restored through the implementation of a large-scale reforestation program. The project exceeded all Argentine requirements. Several alternatives were studied in the main transmission line in order to minimize the social and environmental impacts of the project. Such considerations were to: avoid clearing native trees and vegetation of the tropical montane forest; avoid disruptions to the terrain that could promote landslides; utilize available roads and other means of accessibility to facilitate work; avoid urban areas to not compromise their future development through the visual impact of the line; avoid hills and steep gradients; avoid areas with touristic or archaeological value; give preference to river crossings at points with existing bridges; avoid airports; and avoid industrial facilities and infrastructure associated with the transportation of hydrocarbons in order to prevent interference and pollution. The Norte Grande Electricity Transmission Program had the greatest impact in relation to vegetation clearing, which affects approximately 2,750 Ha in the NEA section, 10% of which is located in densely forested areas. To compensate the loss of vegetation, the program increased the area of prime habitat through its reforestation program of approximately 600,000 native-species trees in the NEA section. Designated planting locations are located along transmission line buffer zones and public spaces in regional municipalities. The program also supports research efforts on native species, including their regeneration capacity and potential uses.
	Source	- Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 9, 24-25 - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015) - Ministerio de Planificación Federal, Inversión Pública y Servicios. Plan de Reforestación NEA-NOA (18 July 2012), 5-6 - Roberto Moreno Leiva, Comité de Administración del Fondo Fiduciario para el Transporte Eléctrico. "Anexo V - Especificaciones Ambientales y Sociales, LEAT y EETT de la Interconexión", (10 August 2015), 3 - IDB. Informe de Gestión Ambiental y Social, ESMR: Programa de Interconexión Eléctrica del Norte Grande (March 2006), 5-6
	Recommendations	The Norte Grande Electricity Transmission Program NEA section has increased the areas of prime habitat through its reforestation program and continued monitoring. Further restorative programs can be implemented to increase buffer zones and habitat connectivity along the route of the transmission line.

	Score	NGETP - NORTHEAST SECTION (NEA)
NW1.2 PRESERVE WETLANDS AND SURFACE WATER	18	**Restorative**
		Wetlands provide essential ecological services that include improved water quality, flood and erosion protection, wildlife habitats, water temperature regulation and conservation of hydrological features, and etc. Maintaining the integrity of wetland areas also mitigates associated adverse impacts of infrastructure projects and related development. This credit evaluates a project's assessment efforts, design plans, and subsequent application of wetland preservation. The Norte Grande Electricity Transmission Program conducted an extensive environmental impact study on affected regional wetland areas and potential mitigative actions to protect and maintain aquatic habitats. The project would have minimal negative impacts on surface waters and buffer zones, establishing a vegetation and soil protection zone (VSPZ) of approximately 660 feet employed in sensitive wetland areas per Argentine regulations. Other mitigative measures include the use of injected concrete foundation piles to prevent water contamination, wetland restoration efforts, and risk management contingencies in the event of unforeseen accidental events during construction.
	Source	- Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 164-165, 169-170 - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015)
	Recommendations	Additional enhancement efforts to restore any previously degraded areas and buffer zones to their natural states, as well as assessment of other aquatic habitats and stream channel restoration, would improve the protection of regional wetlands, shorelines and water bodies.

	Score	NGETP - NORTHEAST SECTION (NEA)
NW1.3 PRESERVE PRIME FARMLAND	12	**Conserving**
		Agricultural land supports regional economies and provide food and health security. The identification and protection of agricultural soil support cultural, ecological and economic development. Long-term environmental benefits include wildlife habitat, clean air and water, flood control, groundwater recharge, and carbon sequestration. The transmission line passes through agricultural areas; the project's impact was assessed relevant in certain farmland zones, specifically in powerline head areas. Design modifications through ongoing public consultation with communities and property owners were made prior to construction. The NEA-NOA project's service area measures approximately 44 meters in width and 1,260 km in length; totalling approximately 5,500 Ha. The NEA section's service area totals approximately 2,750 Ha, of which approximately 90% is located on private property used for agricultural activities and 10% in densely forested areas. The landholders used the cleared service area for agricultural purposes, and as a result, they requested the area not to be reforested with endemic trees for continued production capacity. Soil quality was improved through mechanical vegetation chipping and subsequent dispersal as well as partial burying of the organic material, benefiting the overall level of organic matter in the soil.
	Source	- Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 170-173 - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015) - Roberto Moreno Leiva, Comité de Administración del Fondo Fiduciario para el Transporte Eléctrico. "Anexo V - Especificaciones Ambientales y Sociales, LEAT y EETT de la Interconexión", (10 August 2015), 2, 10, 16 - Alberto Levy Ferre (IDB), Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with with Zofnass Team, (3 November 2015)
	Recommendations	While the program employed substantial assessments and mitigations to minimize project impacts on farmland areas through defining the powerline location, further efforts toward the restoration of previously compromised farmland areas to ensure its conservation for future generations is recommended.

	Score	NGETP - NORTHEAST SECTION (NEA)
NW1.4 AVOID ADVERSE GEOLOGY	3	**Superior**
		Adverse geologic formations in infrastructure project development can compromise groundwater resources, aquifers and create community, environmental and operational hazards. This credit evaluates a project's assessment of sensitive areas such as earthquake zones and coastlines. The Norte Grande Electricity Transmission Program conducted extensive geologic and geomorphic studies that included in-situ observations, geologic mapping and remote sensing methods for geologic studies that included earthquake risk analyses. The project is located in a region with varied degrees of tectonic and earthquake risk. To that end, risk was considered in structural design elements as well as emergency response plans, mechanisms and contingencies. It was concluded that no adverse geologic effect on aquifers was present. Continual monitoring during the construction phase was applied, and monthly audits are currently conducted in the operational phase. In the event unforeseen geologic risks surface, corresponding studies and risk mitigation strategies will be applied. The project does not affect aquifer quality or availability during construction or operations.
	Source	- Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 17-18, 153-154, 165 - Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015)
	Recommendations	Given the regional scale of the program, earthquake faults can't be avoided, hence the inclusion of multiple levels of protection and public education to complement risk management plans in case of infrastructure failure is recommended.

	Score	NGETP - NORTHEAST SECTION (NEA)
NW1.5 PRESERVE FLOODPLAIN FUNCTIONS	8	**Superior**
		Sustainable infrastructure design accounts for the maintenance of floodplain storage and water management capacities and capabilities that maintain flood elevation. Preservation of floodplain functions through restricted development in low-lying areas mitigate increased storm runoff volume, stream temperatures, and pollutant loading on waterways. The main component of the Norte Grande Electricity Transmission Program is the extra high tension transmission line. Because of the typology of this infrastructure floodplain, functions are not affected and pre-development floodplain infiltration and water quality are maintained. Information was not available on other types of development connected to the program, as such complementary development impacts on floodplain functions. Norte Grande maintains and enhances area-specific vegetative habitats through its Reforestation Program restoring and enhancing soil infiltration capacity, and flood emergency plans are in place in the event of an emergency situation. Additionally, original topographies and natural waterways are considered of importance. The contractor contract stipulates that any disruption requires restoration of natural drainage systems to prevent erosion and damages.
	Source	- Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 162-163, 165. - Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015). - Roberto Moreno Leiva, Comité de Administración del Fondo Fiduciario para el Transporte Eléctrico. "Anexo V - Especificaciones Ambientales y Sociales, LEAT y EETT de la Interconexión", (10 August 2015), 2-5, 12, 14.
	Recommendations	Strategies for enhancement of existing habitat connectivity and sediment transport to the natural floodplain intends to maintain habitat for riparian and aquatic species. Whether desirable, threatened or endangered, these strategies will advance and recuperate floodplain functions beyond the project scope for increased conservation.

	Score	NGETP - NORTHEAST SECTION (NEA)
NW1.6 AVOID UNSUITABLE DEVELOPMENT ON STEEP SLOPES	1	**Improved**
		The avoidance of infrastructure project development on steep slopes and hillsides that protect the project and local regions from erosion, landslides, fires and other natural hazards is evaluated in this credit. Terrain change in steep slopes also create greater financial burden for construction and maintenance of a project. The NEA section is located in a region without extreme steep slopes. Nonetheless several alternatives were evaluated for the passage of an extra high tension transmission line, and one of the considerations included was to avoid disruption to the terrain with potential landslides. The installation of towers followed Argentine regulations regarding development, and the application of this best management practice minimized erosion and the potential for landslides.
	Source	- Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 26. - Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015). - Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 116-117. - IDB. Informe de Gestión Ambiental y Social, ESMR: Programa de Interconexión Eléctrica del Norte Grande (March 2006), 5-6.
	Recommendations	The minimization of excessive erosion and landslides should be a consideration for infrastructure siting. Moreover, the work with local official, property owners, and other stakeholders is recommended to select the best possible location for the project. Although the NEA section does not transverse areas with steep slopes, continued focus on minimizing future erosion potential is recommended.

	Score	NGETP - NORTHEAST SECTION (NEA)
NW1.7 PRESERVE GREENFIELDS	0	**No Score**
		The selection of a project's location in previously developed greyfield sites or brownfields over areas categorized as greenfields minimizes adverse impacts on wildlife and reduces the necessity of supporting infrastructure development to service the project's requirements in water, transportation and other services. Greyfields are categorized as previously developed sites that are currently abandoned or underutilized. Brownfields are properties with documented contamination as a result of previous uses. Consideration of greyfield and brownfield sites can reduce pressure on greenfield areas and support resource conservation. Given the linearity and length of the main transmission line and the relatively small footprint area of each tower foundation in relation to the complete project, considerations were not made to address project location in previously developed sites. Furthermore, no information was provided that addresses greyfield or brownfield utilization criteria for the siting of associated complementary substation facilities.
	Source	- Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015). - Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 118-119.
	Recommendations	Even though considering the linear condition of the transmission line and the many types of properties affected, it is recommended that for complementary facilities to select previously developed greyfields and/or sites classified as brownfields in order to conserve undeveloped land. Furthermore, future consideration of potential sites for remediation can be examined in order to minimize environmental impacts, as well as assist in areas restoration.

	Score	NGETP - NORTHEAST SECTION (NEA)
NW2.1 MANAGE STORMWATER	1	**Improved**
		Minimizing the impact of a site's stormwater runoff is reviewed in this credit. The reduction of impervious surfaces in project planning and implementation allows for greater water infiltration into soil, plant absorption and expiration, and reduced surface runoff. Increased surface runoff can lead to erosion, changes in flow and downstream flooding, as well as an increase in water temperatures and surface water pollutants. Percentages in improvement for greyfield and brownfield sites specifically in regards to water management is assessed. The program conducted extensive hydrological and effluent studies in the Environmental Impact Assessment on areas affected by the main transmission line. It was determined the lines do not increase impervious surfaces, hence ground infiltration of stormwater remains unaffected. Stormwater management programs were not considered for associated substations; as such it is not possible to measure the project's impacts on water storage capacity corresponding to substation facilities. Two types of residual management plans are employed and monitored for water in accordance with regulatory requirements: hydrocarbons and oils, and, accidental spillages and breaks - both of which address water quality.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015). - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 84-85, 201-203. - Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 120-121.
	Recommendations	Development of the program's stormwater management plan to increase storage and infiltration capacity of the regional ecosystem is necessary. In addition, the complementary substation facilities that increase the amount of impervious surfaces, should include strategies to minimize stormwater runoff.

	Score	NGETP - NORTHEAST SECTION (NEA)
NW2.2 REDUCE PESTICIDES AND FERTILIZER IMPACTS	0	**No Score**
		The reduction and elimination of non-point-source pollution of pesticides and fertilizers that include quantity, toxicity, bioavailability and persistence in the environment is assessed in this credit. A project's operational policies, runoff controls, material selection and/or other landscape management techniques in relation to pesticides and fertilizers are evaluated. According to the Environmental Management Plan of the LEAT NEA - NOA, the program for the protection of the flora, fauna, land, and hydric resources maintained application of chemicals with adverse environmental impacts be minimized and only utilized when imperative. Furthermore, the reforestation program uses only non-invasive, native-species trees that require minimal care and do not require application of pesticides and fertilizers. A 99% survival rate is expected for the project's reforested trees under normal conditions. Pesticide and fertilizer contamination of watersheds was not measured because the substances were not used. Manual vegetation clearing was performed to prepare the sites for construction with environmental consideration through the protection of existing natural resources. However longer-term maintenance practices in substation sittings with the use of pesticides and fertilizers was not addressed.
	Source	- Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015). - Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 122-123. - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 23-25. - Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with with Zofnass Team, (2 November 2015). - Linsa, Plan de Compensación Forestal Interconexión LEAT 500 kV NEA-NOA Tramo Este, (9 September 2011), 7-12. - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto - Ambiental Interconexión NEA-NOA, Plan de Gestión Ambiental y Mitigación (March 2006), 49-50, 194.
	Recommendations	Consideration of the project's long term operational and maintenance programs regarding vegetation and pest control in the project's substation sittings, if required, should include the utilization of non-toxic and persistent materials as well as integrated pest management techniques.

	Score	NGETP - NORTHEAST SECTION (NEA)
NW2.3 PREVENT SURFACE AND GROUNDWATER CONTAMINATION	9	**Superior**
		This credit addresses equipment and process facilities that prevent pollutants from contaminating surface and groundwater contamination, and the monitoring of impacts over the operational life of the project. The program conducted encompassing hydrological studies and management plans to determine and contain potentially affected surface and groundwater contamination through analyses on natural habitats and contaminant impacts, principally focused in the construction phase. Items addressed are categorized in four areas: municipal waste, project materials, oils and hydrocarbons, and, potential activity leakages. Containment policies and procedures were implemented in the design and construction phases through monitoring and contingency programs, primarily associated with spillages and leaks. Continued application of containment plans in the operational phase are stipulated in the concessionaire contracts and corresponding policies are in place to manage spills and leaks.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015). - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 84-85, 201-203. - Roberto Moreno Leiva. Comité de Administración del Fondo Fiduciario para el Transporte Eléctrico. "Anexo V - Especificaciones Ambientales y Sociales, LEAT y EETT de la Interconexión", (10 August 2015), 26. - Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 120-121.
	Recommendations	An organizational shift from potential contamination response practices to prevention of source reduction and elimination methodologies in contaminants is recommended. Restoration efforts of water-supply wellhead areas that go beyond spills and leakages will improve and restore future contamination sources and augment sustainable infrastructure practices.

	Score	NGETP - NORTHEAST SECTION (NEA)
NW3.1 PRESERVE SPECIES BIODIVERSITY	2	**Improved**
		The preservation of habitats includes linking habitats is crucial for biodiversity to promote genetic diversity translation across habitats. Projects that jointly work with local, public agencies to identify existing habitat and compensate for losses as well as employ long-term monitoring efforts toward preservation are evaluated in this credit. The Program assessed habitat and species biodiversity prior to construction stages in the Environmental Impact Assessment and EMSR. The project would have minimal permanent impact in habitat to flora and fauna in both the construction and operational phases. The principle effects on habitat, flora and fauna were a result of vegetation clearing, human activity during construction and main transmission line structures posing risks for birds. Devices were installed to protect the birds. Barriers were not built along the transmission line and the project allows for animal crossings. Furthermore, the identification of sensitive habitat areas was made and mitigation measures to protect animal habitat were employed by initial design location modifications. Additionally, the contract specifies that selective clearing techniques be utilized to minimize adverse effects on flora and fauna. Additional connectivity designs to facilitate movement between habitats were not addressed. Nonetheless, species biodiversity preservation was supported primarily through mitigation efforts of the project's extensive reforestation program with native-species trees that restored habitat quality after vegetation clearing.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015). - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 10, 161, 227, 234-236. - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan Gestión Ambiental y Mitigación (March 2006), 195. - IDB. Informe de Gestión Ambiental y Social, ESMR, Programa de Interconexión Eléctrica del Norte Grande (March 2006), 30-31.
	Recommendations	Further evaluation of facilitating movement between habitats with improved connectivity by providing new connections and/or removing existing barriers to extend wildlife corridors is recommended.

	Score	NGETP - NORTHEAST SECTION (NEA)
NW 3.2 CONTROL INVASIVE SPECIES	5	**Superior**
		Non-native flora and fauna species are invasive and adversely affect habitats and bioregions by forcing native species out of their habitats to compete for required nutrients, light, physical space and water. Nonindigenous species can alter ecosystem functions, lead to the decline or extinction of native species, and change available food systems and living habitats. The main objective of the Reforestation Program was to reforest areas that were cleared through necessary site preparation for project construction. The project uses only local, non-invasive plants, and works with regional public agencies and community groups to determine proper plant type and location. While the original objective of a 460,000 native-species trees per annum was established, the reforestation program exceeded the objective and has incorporated approximately 600,000 trees to date. Reforestation includes forest pastures and Prosopis Alba among other others. Nevertheless, no strategies for the elimination or reduction of specific, non-native, invasive species were addressed, except in previously established agricultural zones.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015). - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 229-230. - Ministerio de Planificación Federal, Inversión Pública y Servicios. Plan de Reforestación NEA-NOA (18 July 2012), 5-6. - Linsa. Plan Integral de Compensación Forestal, Interconexión LEAT 500 kV, NEA-NOA Tramo Este, (9 September 2011), 8.
	Recommendations	The creation of an active management plan coupled with the current reforestation program for the control and elimination of non-native, invasive species is necessary. Further methods that rehabilitate habitats to their pre-invasive state would improve performance in this credit.

	Score	NGETP - NORTHEAST SECTION (NEA)
NW3.3 RESTORE DISTURBED SOILS	8	**Conserving**
		The restoration of soils that were disrupted during project construction activities as well as soils disturbed as a result of previous development to bring back hydrological and ecological functions is evaluated in this credit. The Program restored all soil disturbed during construction in the site's vegetative areas. Additional soil restoration activities addressing disturbed soils in previous development sites was not addressed. The project documentation stipulates that all contractors hold minimal impact and disrupt soil conditions only to the extent necessary for project construction and operation. However management plans to develop area-wide restoration of topsoils and subsoils were not considered beyond regulations and construction permits. Additionally, the organic quality of the topsoil was improved. Also, aeration and infiltration through the practice of mechanical chipping of the cleared vegetation and reincorporating the material into the topsoil at site locations and nearby areas.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015). - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 26. - Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in communication with with Zofnass Team, (2 November 2015).
	Recommendations	Besides the restoration of soil disturbed during construction in vegetated area affected by the easement strip of the project, the scope of the project should include further restorative activities in soil disturbed by previous development, improving area wide hydrological and ecological functions in the region.

	Score	NGETP - NORTHEAST SECTION (NEA)
NW3.4 MAINTAIN WETLAND AND SURFACE WATER FUNCTIONS	9	**Superior**
		Waterways, wetlands, waterbodies and associated riparian areas perform essential ecosystem functions. Maintaining, enhancing or restoring aquatic system functions can be accomplished in four areas: through addressing hydrologic connections, water quality, habitats and sediment transport. The Program considered three aquatic environment maintenance topics: hydrologic connections, water quality and habitats. The fourth, sediment transport, was not applicable to the project; the Environmental Impact Assessment determined that sediment transport would have minimal effects because environmental footprints of transmission line foundations are negligible. Surface and groundwater impacts were also determined to be minimal beyond the construction phase according to the nature of the project. Hydrologic connections in surface waters are maintained and there is no direct impact on groundwater sources. Additionally the project does not require groundwater pumping. Monthly water quality monitoring programs during the construction phase are stipulated in the contractor contract. The contract requires contractors to assure the works not to disturb wetland ecosystem areas through constrained access road construction and proper equipment use - such as flotation tractor wheels to minimize tracks and support aquatic habitats.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (15 October 2015). - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 9, 25, 237-239, 194-195, 201-203.
	Recommendations	Added efforts to fully restore compromised wetland areas beyond maintenance of existing conditions directly affected by the project construction and operational phases aimed to accomplish fully-functioning aquatic and riparian ecosystems is recommended.

	Score	NGETP - NORTHEAST SECTION (NEA)
QL0.0 INNOVATE OR EXCEED CREDIT REQUIREMENTS	0	The Norte Grande Electricity Transmission Program NEA has maintained exceptional performance and far-exceeded industry norms and system requirements in the Natural World category; specifically correlated with reforestation. The innovative and outstanding design and implementation of the project's extensive reforestation program surpasses performance requirements for a transmission line. The program's reforestation practices that include the planting of approximately 600,000 of endemic-species trees, establishment of nurseries, specified contractor requirements, monitoring, engaging community involvement, supportive community empowerment, regional employment opportunities and inspection policies have now become the innovative standard for analogous projects nationwide. Additional benefits of the reforestation program include: prime habitat preservation; approximately 13,800,000 tons CO2 of annual carbon sequestration; improved air quality; natural resource and ecosystem preservation; and the control of invasive species without the use of pesticides or fertilizers. The Norte Grande Electricity Transmission Program has set the standard and created transferable methods across multiple projects in reforestation practices and implementation in Argentina.
	Source	- Roberto Moreno Leiva (CAF Responsabilidad Ambiental y Social) in communication with Zofnass Team, (27 January 2016). - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía, Comité de Administración, Fondo Fiduciario para el Transporte Eléctrico Federal. Plan de Reforestación NEA-NOA. Buenos Aires (18 July 2012), 5-10 - IDB. Informe de Gestión Ambiental y Social, ESMR, Programa de Interconexión Eléctrica del Norte Grande (March 2006), 13, 40 - LINSA. Plan de Compensación Forestal (6 June 2011), 2-3, 5-8 - Roberto Moreno Leiva, Comité de Administración del Fondo Fiduciario para el Transporte Eléctrico. "Anexo V - Especificaciones Ambientales y Sociales, LEAT y EETT de la Interconexión", (10 August 2015), 3 - LINSA. Plan Integral de Compensación Forestal – Informe Situación de Plantines. (20 September 2013), 1-4. - LIMSA. Informe Auditoria Ambiental Final - Sistema de Interconexión LAT 500 kV NEA-NOA Subtramo Este (3 April 2012), 8 - CAF. Informe de Verificación Ambiental – Plan de Compensación Forestal, Interconeccion NEA-NOA, Tramo NEA (September 2012). - LINSA. Actas de Entrega de Plantines (8 September 2014), 1
	111	

SUB CATEGORY: CLIMATE & RISK		
	Score	**NGETP - NORTHEAST SECTION (NEA)**
CR1.1 REDUCE GREENHOUSE GAS EMISSIONS	0	**No Score**
		A comprehensive life-cycle carbon analysis to reduce the anticipated amount of net greenhouse gas emissions over the life of the project is assessed in this credit - including emissions and sequestration efforts. Carbon emissions caused by materials extraction and processing, transportation during construction and operation, and project maintenance and operation, including vehicle traffic are incorporated into the assessment. While the program employed rigid controls in regards to vehicular and equipment emissions, a carbon life cycle analysis or carbon footprint for anticipated greenhouse gas emissions over the life of the project was not conducted. The reforestation program of approximately 600,000 trees helps mitigate project greenhouse gas emissions through carbon sequestration. One tree sequesters approximately 23 Kg of carbon dioxide on an annual basis; it is estimated that 13,800,000 tons of CO2 are sequestered by the project's NEA reforestation program annually. Without a comprehensive life-cycle analysis of the project, however, it is not possible to measure the level of achievement in reducing the project's carbon emissions compared to regulatory requirements and industry standards.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (22 October 2015). - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 201-203, 221-223. - Ministerio de Planificación Federal, Inversión Pública y Servicios. Plan de Reforestación NEA-NOA (18 July 2012), 5-6. - Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social). Plantines para Reforestar (n.d.), 17. - Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in communication with with Zofnass Team, (24 November 2015).
	Recommendations	A life-cycle carbon assessment of recognized and accepted methodologies on the project is recommended. This assessment should include a comprehensive analysis of carbon emissions generated for key materials utilized in the project including extraction, refinement, manufacturing and transportation. Once the analysis is complete, efforts to reduce carbon emissions in a systematic method of percentage reductions can be applied.

	Score	NGETP - NORTHEAST SECTION (NEA)
CR1.2 REDUCE AIR POLLUTANT EMISSIONS	0	**No Score**
		A set of six criteria pollutants used to evaluate this credit are: carbon monoxide, nitrogen oxides, sulfur dioxide, particulate matter, ground-level ozone and lead. These pollutants have been determined to cause adverse effects on human health, property and the environment. Most at risk are children, the elderly, and others with chronic lung diseases such as asthma, bronchitis and emphysema. Dust and odors can also aggravate the above mentioned medical conditions. The Norte Grande Electricity Transmission Program employed policies, management and monitoring plans to mitigate air pollutant emissions required by Argentine regulations. The largest emission pollutants were generated during the construction period by equipment movement, also the operational phase is considered to create insignificant emissions. Strategies for compliance are stipulated in contractor contracts to address two categories of emissions: oils, grease and hydrocarbons, and dust control. Both categories are monitored and effects are minimized through the management plan through certified equipment maintenance checks and access road spraying. Additionally, the reforestation program of 600,000 trees also helps mitigate adverse emissions affects. The project, however, did not document measurement of all six of the aforementioned criteria pollutants to meet stringent guidelines of the California Ambient Air Quality standards.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (22 October 2015). - Ministerio de Planificación Federal, Inversión Pública y Servicios, Secretaría de Energía. Evaluación de Impacto Ambiental Interconexión NEA-NOA, Plan de Federal del Transporte en 500 kV, (March 2006), 201-203, 221-222. - Ministerio de Planificación Federal, Inversión Pública y Servicios. Plan de Reforestación NEA-NOA (18 July 2012), 5-6.
	Recommendations	Performance improvement in this credit can include the addition of further mitigation controls and policies from sitting areas to source reduction strategies in the project's equipment movement. Measurements and air quality improvements that reduce existing ambient air pollutant emissions would minimize total emissions in the six criteria pollutants is necessary.

	Score	NGETP - NORTHEAST SECTION (NEA)
CR2.1 ASSESS CLIMATE THREAT	0	**No Score**
		Currently, greenhouse gas concentrations in the atmosphere are sufficiently high to produce variations in long-term climate change. Reduction of greenhouse gas emissions to reduce carbon dioxide equivalent (CO2e) may mitigate future climate change. The most anticipated effects of climate change include changes in long-term weather patterns, increase in extreme weather events and hazards, sea level rise and increased desertification. Communities rely on infrastructure to provide needed and basic services, and system failure can cause devastating consequences. Therefore, the effect of climate change is an important factor to consider in infrastructure projects design. Assessing climate threat in infrastructure that include adaptation plans assists in risk management and potential project-related responses. The Norte Grande Electricity Transmission Program did not complete a comprehensive Climate Impact Assessment and Adaption Plan to prepare for potential climate variation and natural hazards. Specific areas, particularly floodplains, were considered in regards to minimizing equipment damages as much as possible for the project, considering a useful life of over 50 years. However plans to identify risks related to climate change and possible responses were not evaluated.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (22 October 2015). - Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 144-145.
	Recommendations	Development of a comprehensive climate impact assessment and climate adaption plan is recommended to identify risks and responses. The assessment may include calculation of expected flood elevations and flooding potential considering extreme storms. Additionally, community response and outreach efforts addressing potential scenarios and adaptation plans would help prepare the project and minimize adverse effects related to climate change.

	Score	NGETP - NORTHEAST SECTION (NEA)
CR2.2 AVOID TRAPS AND VULNERABILITIES	0	**No Score**
		Infrastructure projects that account for long-term effects of resource depletion, extreme natural or human-caused events, economic changes, or adaptation techniques are evaluated in this credit to avoid added project-related risks and community vulnerabilities. A non-sustainable operating environment can increase demands for natural resources and energy supplies through rapidly expanding economies, population growth, and other previously non-existent variables. Infrastructure project designers must consider critical elements to determine the extent to which the mean variance and plausible extremes can change over a project's life cycle. Evidence of trap avoidance and vulnerability assessments regarding long-term climate change in relation to the project and community was not available in the Norte Grande Electricity Transmission Program. Community consultation addressed risks and vulnerabilities on a cost basis that only addressed electricity supply and delivery. The identification of key engineering design variables regarding crucial and vital resource constraints in the long-term, and of the project's methodology towards the community's increased cost, risk and vulnerability are not considered in the design.
	Source	- Roberto Moreno Leiva. (CAF Responsabilidad Ambiental y Social) in discussion with Zofnass Team, (22 October 2015). - Institute for Sustainable Infrastructure, Zofnass Program. Envision Manual (n.d.), 146-147.
	Recommendations	The infrastructure systems level must assess the long-term effects of resource constraints, extreme events and other traps on the community infrastructure as a whole in addition to assessing potential costs and risks. Through the assessments and community consultation, design improvements can be made and communitywide risks reduced. The ultimate objective of these actions is to make a significant contribution to community robustness and resiliency in the face of change.

APPENDIX E: SOURCES

DOCUMENTATION PROVIDED
General Information
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