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CONCENTRATION PLANT CERRO DOMINADOR – CHILE

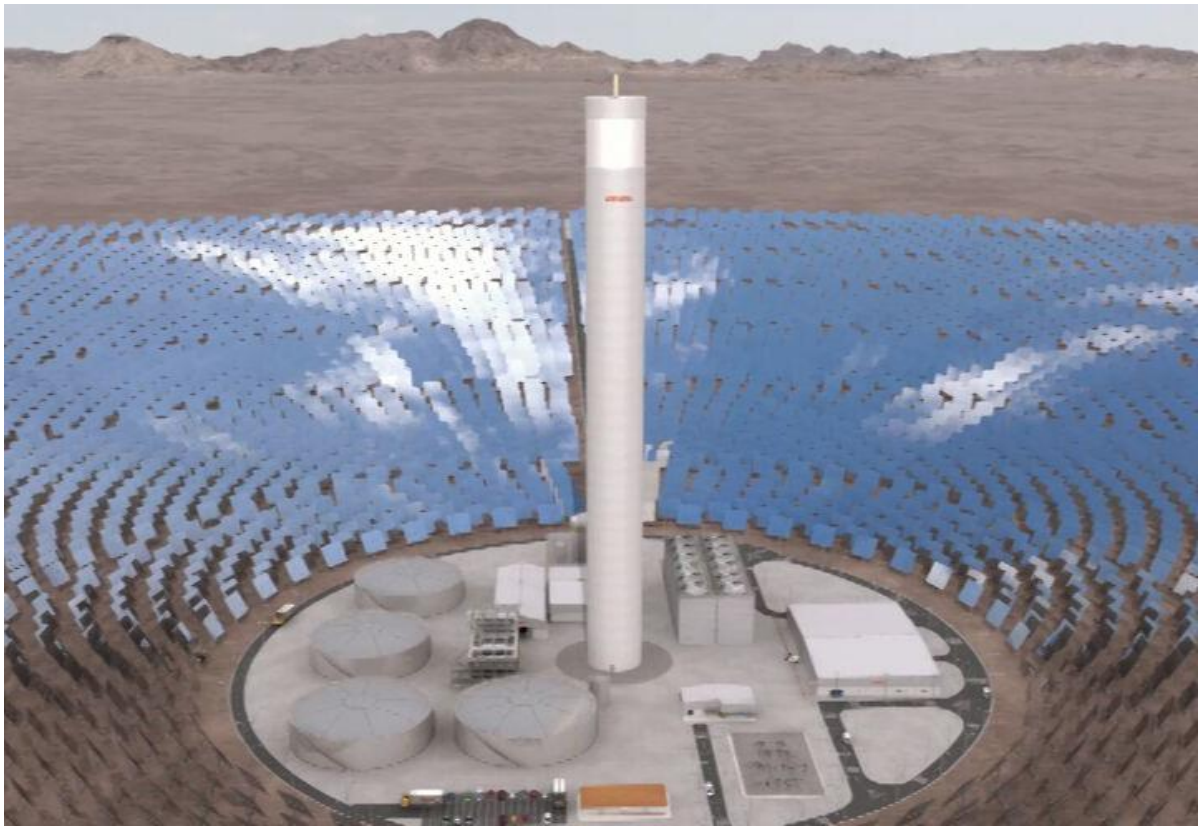

Figure 1: General view of the facility (infographics)
Sources: Picture provided by Abengoa

Cristina Contreras prepared this case study in collaboration with Jiyoo Jye and Judith Rodriguez as part of the Harvard-Zofnass program directed by Dr. Andreas Georgoulias by initiative of IDB for the purposes of research and education. Editing and Proofing: Jiyoo Jye and María Ignacia Arrasate

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

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1. PROJECT DESCRIPTION & LOCATION

Cerro Dominador, a concentrated solar power plant, is located in a rural area 60 km from the city of Calama in Chile. It is considered a non-conventional renewable project, and will represent one of the most innovative projects in Latin America due to its capacity to generate electricity 24 hours a day. The project consists of a 250 meters solar tower and 10,600 mirrors, all reflecting to a single point in the tower. It will generate 110 MW while removing 643,000 tons of CO2 emissions from the atmosphere per year. The project will promote renewable energy development in Chile as well as the reduction of GHG and other pollutants associated with conventional power generation. Cerro Dominador also plays an important role in the communities' development and in the socio economic revival of the area, as it is considered a catalyst for technological innovation in the region creating multiple direct and indirect jobs.

The project includes the construction and operation of a plant for the production of energy. This plant will consist of a Concentrated Solar Plant (CSP) with tower technology with a production capacity of 110 (MW) and one photovoltaic plant with crystalline module technology with a total capacity of 110 (MW). Additionally, the project will have a substation and transmission line to supply power to the Northern Interconnected System (SING). The solar thermal tower technology provides a set of mirrors (heliostats) that track the sun on two axes, concentrates the solar radiation onto a receiver at the top of the tower. It is at the receiver where the heat is transferred to the fluid heat transfer fluid to produce steam. The generated steam feeds a steam turbine that is capable of producing around 110 MW alternator terminals. Also, the plant has a thermal storage system base on salts, which will allow to operate the plant for 24 hours, giving this technology a high degree of efficiency.

This project is based on the excellent levels of radiation present in the north of Chile and Abengoa Solar's experience in energy production. In particular, the project is based on the experience gained by Abengoa Solar SA in their thermal power towers PS 10, PS 20 and Eureka currently in operation in the town of Sanlúcar la Mayor (Seville) and the plant Khi Solar 1, which is under construction in South Africa, and other plants operating in Spain, South Africa and the Middle East, for a total of 1,223 MW in operation and 430 MW in construction.

Cerro Dominador Solar Plant will be located in a rural area located in the commune of María Elena, Tocopilla Province, Antofagasta Region, at a height of approximately 1,550 meters. The selected site is located in a privileged location due to several reasons: There is an excellent level of solar radiation and low humidity, orographic conditions, flat, clear landscape without any vegetation, suitable terrain to place the field heliostat, close proximity to public roads (Route 5 and Route 25), and the existence of power lines for transmission connection. There is

a lack of communities or populated areas in the immediate vicinity of the project since the project is located in a rural area in the desert region. In addition, the project area has no resources or protected areas or any areas declared as national tourist site interest. Only a few vestiges of the found nitrate activity, whose background and location has been carefully documented on a Archaeological Inspection Report. It should be noted that to characterize the area, fieldwork was conducted with specialists landscape, vegetation, wildlife and archeology.

Due to the high electric demand in the country the Chilean Government through CORFO and the Ministry of Energy, held an international tender in 2013. One of the requirements was a high efficiency concentrated plant. The project " Planta Solar Cerro Dominador" was awarded by the Chilean government with the construction and operation of the project for a period of 30 years that started counting the April 7, 2014. A viability and economic feasibility study after this 30 years, will determine a future expansion of the facility for 20 more years. The project is currently owed by Abengoa´s group, which has created a special purpose company to carry out this project -Abengoa Solar Chile- where the Abengoa´s group has a percentage of direct and indirect ownership of 100% of the project.

The evaluation presented below was conducted between September and December of 2014. At the start of the evaluation the project was at the beginning of the construction phase with 5% of progress. After the evaluation, in December of that year, the project had a 10% of progress in its construction. According to the schedule of the project's activities, construction will be completed in mid 2018 to start the operations phase of the plant. Therefore, due to the early stage of the project at the time when the evaluation was conducted many of the commitments mentioned in the documentation provided will be materialize in the future in accordance with the progress of the project.

2. APPLICATION OF THE ENVISION RATING SYSTEM

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 high concentration solar plant Cerro Dominador, Chile.

Envision consists of 60 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 if the qualifications for each level of achievement have been met for a particular credit. In each of the five categories there is a specific 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[1] and Zofnass Program[2] websites.

3. QUALITY OF LIFE CATEGORY

Envision's first category, Quality of Life, pertains to potential project impacts on surrounding communities and their respective wellbeing. More specifically, it distinguishes infrastructure projects that are in line with community goals, clearly established as parts of existing community networks, as well as consider the 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 further divided into three sub-categories: Purpose, Wellbeing, and Community.

Purpose

In the Purpose sub-category, Envision aims to implement innovative ways to engage the community and the regional residents in the development and construction of Cerro Dominador energy plant. The implementation of a non-conventional renewable project will create electricity and improve the community quality of life without generating resettlement or affecting the communities protected by special laws.

During the construction phase Abengoa will build a camp with the capacity for up to 700

[1] www.sustainableinfrastructure.org

[2] www.zofnass.org

people, this facility will provide all the services required solving at the same time other issues such as transportation to the site. PLADECO[3], 2010-2014, a community development plan was integrated into the region of Maria Elena, setting the guidelines for strengthening civil society, recovering historical heritage, culture, recreation, education, and health. In addition, to promote a more collaborative approach among all the parties involved in the process, the participation of several stakeholders and authorities has been encouraged from the beginning of the process. This is intended to create dialogue and promotion of innovation and territorial participation.

Maria Elena has developed a negative net migration pattern over the years with the modernization of the mine working procedures and reduction of necessary labor. The construction of Cerro Dominador will introduce more than 2,000 employments, out of which 60 people will be hired for operation post construction. Following the measures proposed at the Environmental Impact Assessment, integration for developmental strategies, promotion of agriculture, small-scale mining, artisanal fisheries among others in varying territories of the region have been described as future programs to be implemented.

The workers involved with the project, approximately 2,000 at the peak of construction, will receive ongoing training from the project staff. The training covers all topics of environmental aspects, waste management, handling of hazardous substances, and environmental emergencies contingency management. The waste management will be classified into three major types including household, industrial, and hazardous. Workers will also learn how to handle, identify, and store hazardous substances as well as the procedures to follow in case of related emergencies. Abengoa will provide technical support and a 6-month margin to implement the emissions accountant into the company procedures, increasing long-term competitiveness of local companies. As described on the agreement signed between the Fundación Chile[4] and Abengoa Solar, the programs will integrate several elements, including scholarships for recent graduates to work in a facility from Abengoa worldwide, Bachelor's degree offered in solar energy with opportunities to develop a master's program, and short term courses in concentration solar plant among others. It is hoped that the promotion of studies and research in this field will contribute to build local capacities and promote technology transfer to drive the change towards a more sustainable future for Chile. Therefore, the project has shown an outstanding performance on long-term capacitation, scientific knowledge and human capital development, which has provided innovation, credits to this category.

3 Developed by a third party (consultant company) together with the Antofagasta Regional Government

4 Private non-profit organization that connects scientific research with industrial development and mining. In this agreement, the organization represents the SERC (Solar Energy Research Center) led by Universidad de Chile with the participation of several Chilean universities.

Community

The Community sub-category discusses prevention and management of risks and safety procedures, effect of the construction on the greater community as well as improvements in mobility and accessibility. Located more than 15 km apart from the closest residential communities, the construction site presents very low risk and disturbance in its isolated area. In order to assess noise emissions from the construction site, the project team calculated the noise control during construction where the sound pressure levels met regulatory limits. Additionally, a series of actions are implemented in order to prevent and control any potential risks. The workers receive fundamental training, yearly safety protocol simulation, and ongoing instructional support from the construction company. An emergency plan guide developed by the project team is provided on the website. There are security systems to detect and prevent any type of risks associated with procedural tasks.

One of the highlighting factor of the project is the convenient site accessibility through preexisting road infrastructure. Around 2,000 people are estimated to be employed during project peak time therefore mobility and access to the site was taken into great consideration, incorporating the construction of camp housing for around 700 workers on site. Other improvements for accessibility include private bus transportation for workers that will pick them up in the morning and drive them to the facility and back in the evening. The construction of this project is expected to improve some of the non-unpaved connections paths between the facility and the main roads to promote a more efficient commute. The internal accessibility of the project site consists of paved main access and un-paved secondary paths to move around the site. Roads accessing different points of the solar plant, with installed signalling and safety systems. Security systems include a perimeter fence around the plant and a security camera by the gate to identify visitors. The entrance, exits, maximum speed and circulation are marked along each sections of the road to ensure safety on the area.

Wellbeing

In this subcategory, the project's focus on the preservation of historic and cultural resources as well as the conservation of local character is discussed through archeological implementations and landscape assessments. Most of the elemental discoveries of the site trace back to exploitative mining residues of saltpeter and nitrate from between late 19th century to early 20th century. A total of 35 historic archaeological entities and 192 wells for caliche are located in this area. The project's informative development has induced a voluntary commitment for developing a scientific publication, which revolves around the historical study and spatial analysis of all elements identified in the area of the project site. Even though no structures for preservation were identified in the Archeological Inform, the publication will contribute to the

dissemination of studies focused around industrial heritage and the historical link to exploitation of saltpeter.

Additionally, a landscape assessment analyzes the impact on the views of the landscape and the local character integrity prior to the project. After the assessment, the project has not identified any negative impact on the local communities. There are traces that show alterations on the landscape due to previous mining operations as well as added power lines and renovated paths. According to the documentation provided, the project will not obstruct visibility on areas of importance to the community or interfere with local character or affect tourist value. Despite the low population of the area, small measures have been implemented to ensure no landscape view is impacted or disturbed. The line structures that are located within 500 meters from the public road and the external closure should be painted with colors with chromatic harmony with the surrounding landscape. Roads that are expected be obsolete after the construction should be returned to its natural state. It has been specified that the contractor should avoid the use of strong colors with high contrast on the surrounding landscapes.

Innovation point

The project has shown an outstanding performance on long-term capacitation, scientific knowledge and human capital development. This commitment was shown early on during the project bid. Capacity building and technology transfer was one of the sections of the proposal. The programs proposed are “Associative Chilean Universities Program for Training Futures Professionals and Specialists in Solar Technology”, “Collaboration Agreement UTFSM and Focus Abengoa”, “Fundación Chile” Agreement, “Cooperation Program with Universities and Research Centers National for Knowledge Transfer”.

As described on the agreement signed among the “Fundación Chile” and Abengoa Solar, the programs will integrate several elements: scholarship for recent graduates, to work on a facility from Abengoa worldwide. Bachelor degree in solar energy with opportunities to develop a master program. Short term courses in concentration solar plant. Other different programs provide the opportunity to develop a post-professional thesis or create funded R&D opportunities among others.

All these initiative will undoubtedly help to develop better professional on the field who will drive the change towards a more sustainable energy matrix in Chile.

4. LEADERSHIP CATEGORY

Leadership 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 sub-categories: Collaboration, Management, and Planning.

Collaboration

The Collaboration subcategory focuses on how the project aims to emphasize sustainable practices throughout its working network. Sustainable policies implemented by Abengoa are specifically stated including information about the environmental responsibilities carefully assigned to the different members of the project team. The sustainable goals of the project as well as their impact on the community have been identified leading to several target goals. These include plans to create a sustainable region by promoting efficient management of domestic and industrial waste, to enforce environmental liabilities arising from economic activity in the region and to implement specialized regulations on the area and support employment development. Given the early phase of construction of the project at the moment of the evaluation, responsibilities among members and actions fulfillment should be revised in the future. Nonetheless, the roles of the different members that will collaborate on the project were clearly identified on the Environmental Management Plan as well as the periodicity of the actions that should take place. Control mechanisms for the sustainability management systems are robust and estimated to be sufficient enough to demonstrate changing conditions.

The concessionaire Abengoa Solar Chile is 100% owned by Abengoa group thus all parties involved foster the same collaborative teamwork and common goal. A comprehensive planning of different sustainable stages of the project design is implemented in construction, maintenance, operation, and dismantling. Additionally, a very detailed analysis of the Maria Elena community has been conducted. This will help the project team identify the current needs in the area and create a more effective engagement process. The Corporate Social Responsibility report clearly specifies the need to involve stakeholders into the project strategy as well as incorporating the communication channels followed by the different parties (employees, shareholders, suppliers, clients, local communities and society). This kind of community relationship building has been exemplified in different public events such as the participation of María Elena´s mayor inaugurating the beginning of the construction as well as the Chilean national and local authorities visiting Abegoa´s headquarters in Spain.

Management

The Management subcategory looks at how a broader and more comprehensive understanding of the project can allow the team to see and pursue synergies between systems, either within the project or among larger infrastructure systems. According to this no information has been gathered based on the pursue of by-products synergy opportunities in the area. However, several infrastructure elements were taken into account when designing the facility "Cerro

Dominador". The access to the project is through public roads, mainly Route 5 , Route 25 and a road that extends 20.9 kilometers. Also aligned with the principle of infrastructure integration and improvement in efficiency, the project is planning to use an existing transmission line. This transmission line (Encuentro-Sierra Gorda) is owned by Transmisora Mejillones. In the case in which connection to this TL is unavailable, a second transmission line going from Crucero substation to Laberinto substation will be assessable. The use of this transmission line to connect the facility to the grid has created the perfect linkage between new and existing infrastructure. To characterize any other type of elements external to the project apart from the physical infrastructure, a very detailed field work has been conducted. This assessment takes into consideration the landscape, vegetation, wildlife and archeology. No relevant additional infrastructure has been found, however it has been noted by the project team that some community assets such as currently unpaved paths will be upgraded to enhance transportation in the area.

Planning

The duration of the project and the effects of construction as well as a long-term view approach are further explained in the Planning subcategory. Due to the early phase of the project, most of the documentation regarding long-term monitoring and maintenance has not been recorded yet. However, the project is comprised of the construction, operation and maintenance of the solar plant, keeping in mind the plan for addressing conflicting regulations and policies as well as extended useful life in all aspects. Following the Corporate Social Responsibility report, regulation verification is one of the strategies, which reduces project risks. A very detailed analysis of the applicable regulation in this area has been conducted indicating that there are no evidences that some of current standards used on the area may unintentionally run counter to sustainability goals. The useful life of the project has been considered to last 30 years, potentially lasting to 50 years. Once the useful life of the project expires, there is a plan to conduct an economic and technical assessment. This will determine the feasibility of material renewability, so that the lifetime of the project can be extended by twenty more years. If it is determined that the facility upgrade is not possible, the project will proceed to dismantle the plant and all the associated facilities. No evidence of flexible features was incorporated into the design to extend useful life have been provided.

5. RESOURCE ALLOCATION CATEGORY

Resource allocation 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, is 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

Within the topic of resource allocation, the recycling of regional materials is extensively evaluated in order to support sustainable procurement practices. Abengoa is formulating a strong program for sustainable procurement with special focus on Greenhouse gas (GHG) calculation. The implementation of this sustainable practice will be required for all major suppliers working on the project. They will implement an initiative to account and report the greenhouse gas emission to Abengoa. Several files are required from the subcontractor including the "Previous Supplier Evaluation", "Continuous Suppliers Assessment", and the "Annex 1: Adherence to the Code of Social Responsibility."

Regarding used recycled materials, different opportunities for waste reduction have been identified on the waste management plan. The main focus of the credit is not merely based on the recycling strategies but rather on the amount of recycled content that have been used, or will be used in the construction of the project, this is one of the criteria that Abengoa evaluates in its sustainable management program. Utilizing materials with recycled content will reduce the use of virgin materials, which will minimize the amount of waste ending up at the landfill. Abengoa will also control the amount of material locally sourced through its internal software and the estimation predicts that at least 60% of the total material will be locally sourced.

In efforts to divert waste material from landfills, various strategies are implemented in an effort to minimize the amounts of waste generated: perform segregation at source, optimize the use of resources through reuse or recycling, and ensure minimal environmental impact through final disposal at approved sites. The effluent of the treatment plant derived from water used during construction or operation will be reused for wetting road activities, optimizing the use of water as much as possible. It has been estimated that these initiatives will reduce the waste disposal to at least 50%. Additionally, it is estimated that most of the volume of excavated material will be used onsite for different processes. In terms of excavated material reuse, it has been identified that the material from the deepest quaternary deposits (sands with gravel) and volcanic rocks are considered valid for filling.

Once the dismantling phase starts, several activities will take place; decommissioning of the solar tower, solar cells and different equipment, facilities and electrical infrastructure; demolition of buildings and other typology of constructions; elimination of foundations; elimination of interconnections and des-urbanization. It has been stated that in each of the activities of the closure phase, the recovery of equipment and materials recycling will be

evaluated and only those elements that cannot be reused will be sent to an authorized landfill.

Energy

The energy sub-category consists of methods that reduce energy consumption, renew energy, and commission and monitor energy systems. The highly efficient facility of the plant includes several tanks of high temperature salt storage which produces electricity for up to 24 hours. The high temperature is used in a steam generator that operates a moving turbine to produce electricity. Additionally, this is a non-conventional energy project that will generate net positive energy through the use of the sun. The project is divided in two different facilities, the solar tower and the photovoltaic plant. Each of them will supply a capacity of 110 MW of renewable energy. Certain processes such as salt melting in the ad-hoc boiler will require power coming from non-renewable sources during the operation. The extent of renewable energy produced onsite v. utilization of fossil fuels is considered to be net positive.

After the installation and commissioning, several tests will be conducted before the operation of the project. These tests are performed by employees assigned to Group Testings and will be supervised by the Technical Project Manager. The result gathered from these tests will inform a Provisional Acceptance report. Once this report is accepted by the Abengoa Solar, the document Provisional Acceptance Certificate will be issued. An assessment was conducted by a third party identifying the anticipated energy production that the facility will generate once operations begin. It is expected that a detailed plan with a third commission party will measure and document the efficiency of the electrical and mechanical systems implemented on the facility, guaranteeing the best performance.

Water

In the category of water, the main focus is placed in the protection of freshwater availability, reduction of potable water consumption, and the monitoring of water systems. An assessment of the extraction of freshwater without source replenishment is made in effort to generate a steady decrease in the dependence of water availability. The location of the project, which is a deserted area, has no fresh water available for expected use in construction and operation phase, therefore, drinking and industrial water will be supplied by an external company. According to the Adenda N1 of the Declaration of Environmental Impact report, the amount of industrial water estimated to be use during the construction phase is 127,750 m3/year, in the operation phase is equivalent to 267.200 m3/year, and 13,000 during closure. Sewage and industrial wastewater will be handled accordingly, being reutilized for specific tasks, such as cleaning the heliostats and soil wetting in order to prevent dust.

The potable water consumption within the facility will be exclusively for human consumption

with the exception of filter washing during the operation phase. The total amount of potable water that will be used is 38.325 m3 / year during construction, 14.000 m3 / year for operation, and 625 m3/year for closing of the facility. During construction, the generation of nearly 105 m3/day of wastewater is estimated, considering an average of 700 workers. From the wastewater total, 70% will be treated in a wastewater plant and the rest will be handled in chemical baths. To ensure the maintenance of water quality, a water treatment plant for potable water production will be installed in the project facilities, therefore all the potable water will be treated onsite. A water filter will remove the impurities affecting the odor or taste of the water and chlorine will be added to the water to prevent the development of bacteria and germs. The filtered drinking water will be stored in tanks for its use. There will be a recirculation line that returns the water from the tank to the inlet of the water treatment plant to maintain the required quality level for human consumption. After its usage, the water will be recycled into the water treatment plant installed onsite as well.

Based on the monitoring of water during the operations and the impact of the operation on received waters, it is important to point out that there will be no discharges into the water bodies. Even though no water discharges have been planned, a control program for monitoring spills of dangerous substances into streams will be conducted. The only identified risk of water pollution is when trucks, loaded with dangerous substances, cross over water bodies. To assist trucks drivers to precisely locate the water streams on their way, a hydrological network routes map from the Military Geographic Institute will be provided. A very detailed protocol has been designed in case of leakage of hazardous substances. Due to the early phase of the project, long- term monitoring program under regular conditions (no emergency) has not been developed at this point.

6. NATURAL WORLD CATEGORY

Natural World 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 further divided into three sub-categories: Siting, Land and Water, and Biodiversity.

Siting

In the topic of sitting, many considerable aspects are evaluated including the preservation of the prime habitat, preservation of wetlands and surface water as well as the preservation of prime farmland. Other areas were also observed such as ways to avoid adverse geology, or

avoiding unsuitable development on steep slopes among others. The project is located on a desert environment and therefore the soil is considered to have no ecological value for forestry and farming purposes. Desert soils have high concentrations of salt and very fine sand alluvial and soil is underdeveloped, mainly due to extreme weather conditions with little to almost non-participation of water. Thus, no areas with high ecological value have been found.
The geographical landscape where Cerro Dominador is located is mainly flat and 1,482 meters above sea level (masl), surrounded by areas with higher elevation of 1,554 masl. The closest hydrological feature with permanent flow of water is the Loa River. This river is located north of the project area and was identified as non-impacted by the project. A study conducted onsite determined the absence of any water table. The existence of water on the area is mainly seasonal.

The location of the site has been evaluated as inhospitable for any kind of farming purposes. The desert soil composition consists high concentrations of salt and sand and the weather conditions are extreme in terms of heat and cold. A geotechnical study was conducted on the project site near drilling and mechanical pits in the most relevant areas where the project will be located, especially where the main structures of the project will be positioned. A very detailed geotechnical study has been conducted and the study consists on 23 drills, which equals 558 linear meters of drilling. From the 23 drills 18 of them were done on the base of the solar tower and 5 on the solar field. A total of 49 mechanical pits were held in the other sectors of the solar field, which allowed defining a preliminary stratigraphy section of the land where the project is located. This allowed the opportunity to locate the project in a safe area with no adverse geology associated.

In order to not affect the infiltration of soil, a drainage system has been designed around the facility. The channels created are excavations on the ground without any treatment, which will allow free drainage of rainwater. These channels run parallel service roads with the same slope as these and lead the water to discharge specific points. In order to maintain the water management capacities and not impacting the infiltration onsite the water is directed outwards of the project area in a way that can continue the normal flow. The project is considered to be located on a save area without affection of landslides or natural hazards. Greenfields are described as undeveloped land with natural landscape, natural amenities or agricultural land. The landscape in this area is dominated by a natural use, but note that this is in an area with strong industrial, mining development, saltpeter extraction as well as the existence of transmission lines. This transmission lines are structures that disrupt the landscape and lower its quality.

Land & water

The evaluations of land and water are threefold: To manage stormwater, reduce pesticides and fertilizer impacts, and prevent surface and groundwater contamination. A custom system has been designed to capture and regulate the conveyance of stormwater, which can potentially damage the project's facilities. The water from the power island (area where the main facilities are located) is captured and conducted underground outside of the perimeter of the field. The rainwater from the solar field is captured and conducted by channels outside of the project area. The drainage channels are directly excavated on the ground, which allow free drainage of rainwater. Due to the characteristics of the land, it is not required to incorporate additional materials directly on the ground without any treatment. The water will be taken out of the project area allowing the current to continue its flow. This rainwater system minimizes possible impacts on the facility through water capture and distribution.

Pesticides and fertilizers are identified as a source of soil and water pollution, therefore whenever possible; the use of these sources should be reduced or eliminated. According to the information provided, the area of study is described as desert. There is no vegetation required to be treated or close water courses susceptible to pollution. No efforts have been required to reduce the usage of pesticide within the facility.

According to groundwater contamination, a very detail assessment identifying the type of hazardous substances used has been conducted. The operation of the solar plant as well as the potabilisation of the water used onsite will require some chemical usage. The quantities to be storage are around 10 tons, and they follow the current regulations DS 78/2009 established by Ministry of Health. Specific procedures have implemented to avoid potential water contamination to water bodies when being crossed by trucks.

Other protocols such as the decanting process of the wastewater coming from the concrete plant were implemented from early stages. An example of this is the decanting process used for the wastewater coming from the concrete plant. Part of this residue is reused on the concrete plant and part of it is sent to a drying pool where the solid residue is separated and properly disposed. All the water used for wetting the paths will be industrial water that is not appropriate for human consumption. This water will be treated beforehand to avoid groundwater contamination. Most of the described initiatives related to this credit refer to designing for prevention of water spillovers that could create surface and groundwater contamination.

Biodiversity

In the topic of biodiversity, three main focuses include the preservation of species biodiversity, control of invasive species, and restoration of disturbed soil. A very detailed study has been conducted to identify the flora and fauna in the area. Based on the provided information, the area has been classified as desert, without any presence of watercourses which is considered to be an important feature for vegetation growth and species development. As a result, the project will not have a negative effect on native flora. According to the inventory of wildlife in the area, no major evidences of fauna have been found. The observed species were divided according to classes. Several birds were seen in the study area as well as one specie of rodent. No reptiles or amphibians have been seen in this area. Even though not a very diverse category of flora and fauna were found, several mitigation measures were described. Some examples are specific environmental training for employees in order to sensitize them in biodiversity aspects, hunting ban, and incident response protocols in case that wildlife is affected.

Identified invasive species include non-indigenous or non-native species of flora and fauna that adversely affects the habitat or regions they invade. The region where the project is located has been identified as an interior desert of the Antofagasta region. Starting on the border with Peru, the vegetation is very limited, mainly due to the characteristics of the soil with high content in salt. Due to the lack of vegetation of any type, no invasive species have been identified on the area.

The restoration of the soil where the project has been located is an important practice towards sustainability. This will help to bring the land close to its natural state previous to the development. Although the land has been described as mainly flat, some earthworks such as surface cleaning, excavations and fillings will need to be conducted. After the completion of the construction, several measures will be applied to guarantee the restoration of the soil. Some of these measures include the removal of elements that do not belong to the site, removal of materials not used, and terrain compaction to level the ground to its initial state before the intervention.

7. CLIMATE & RISK CATEGORY

Envision aims to promote infrastructure development that are sensitive to long-term climate disturbances. Climate and Risk focuses on avoiding direct and indirect contributions to greenhouse gas emissions, as well as promotes mitigation and adaptation actions to ensure short and long term resilience to hazards. Climate and Risk is further divided into two sub-categories: Emissions and Resilience.

Emissions

The following subcategory covers two major plans to reduce greenhouse gas emissions and air pollutant emissions. Based on the project's emphasis on the production of energy through renewable sources as opposed to the traditional way of energy production, Cerro Dominador will greatly reduce Greenhouse gas emissions. The project team will calculate the greenhouse gas emissions (GHGs) generated by the project as a part of the annual GHG inventory of the company. Accountant of GHG is being done not just at the corporate level worldwide, but for all the subcontractors who are working for Abengoa. These types of practices have been specified far above and beyond the common practices implemented in the country by following the local regulation and good practices.

The project has been assessed as a non-conventional facility for renewable energy production, which will create electricity for up to 24 hours and reduce the amount of air pollutants drastically compared to a conventional method of electricity production. A detailed assessment has been conducted on the amount of air pollutants that will be emitted during the phases of construction, operation and closing of the facility. These pollutants are mainly related to vehicles and other types of machinery and have been identified as PM 10, PM 2.5, NOx, SOx, HC, CH4, N2O and NH·3.

Before starting the operation of the facility, the plant must merge the salts that retain heat captured by the tower. This is a 70 days process. During this operation, emissions of nitrogen oxide will be captured by the system and will reduce the NOx emissions with an efficiency of 99.5%. The NOx emission is estimated at 1,100 [kg / day] based on empirical data from existing plants in operation in Spain. During the phase of operation, the plant does not generate pollutants while the boiler works 1 hour a day, reinforcing the inertia of the thermal fluid. To verify that the emissions were not harmful for the environment, a computational model AERSCREEN has been conducted. This creates a simulation considering multiple simultaneous sources as well as detailed weather information. The result of this report determines that the estimated emissions for the construction phase do not significantly affect the environment.

Resilence

Several components are evaluated within the resilience subcategory including the assessment of climate threat, avoidance of traps and vulnerabilities, preparation for long-term adaptability as well as short-term hazards. Following the guidelines set by Intergovernmental Panel on Climate Change (IPCC), Abengoa analyzes in detail the risk that climate change could cause for certain typologies of infrastructure. The factors evaluated on climate change are mainly based on projection of temperature rise and changes in precipitation. If the temperature rise at the

site of the project is greater than 3 ° C, the risk is considered high, otherwise, the risk is considered low. In matters of rainfall, if the variation of precipitation in the project site is over 10% (+/- 10%), the risk is considered high, otherwise, the risk is considered low. The area is considered to impact high climate change only if both two risks are considered high. This focus on climate change is informed by the projects of biofuel plants, power plants, solar plants, power transmission projects and water pipeline projects.

This project has been designed to provide an answer to two major issues in the country that include the growing demand of electricity and the issue of water scarcity. This is a non-conventional renewable electricity facility, looking for a high efficiency due to the non-stop 24 hour energy production. A high efficient method of water usage is reducing the water usage for energy production. During the construction phase, one of the main areas of greywater production comes from the one generated strictly for the employees. A water treatment plant will be installed within the site and this facility will treat 70% of the total wastewater produced while the rest will be handled in chemical baths. The treated water will be stored and reused for wetting the roads. During the operation period, sewage and industrial wastewater will be handled accordingly. This intensive water management will create a highly efficient system in terms of water usage and, these practices will reduce the vulnerabilities associated with its scarcity.

Due to the long lifespan of the infrastructure projects, it is important to account for long-term climate change as well as project adaptability for long- term scenarios. To provide a score for this credit, a plan designed to identify the proposed alternatives should be taken into consideration during the design phase as well as the changing weather conditions that can create water scarcity, extended drought and heat, heat waves or modification in precipitation. Following project team specifications, a similar assessment was developed during the design phase to identify the most convenient facility design. Most of the risks identified are short-term man-made hazards and these are mostly related to transportation of substances, spills or leakages. The truck drivers will be trained in safety measures to reduce the risk as much as possible. The measures to be taken change according to the type of product transported fuels, oils and lubricants, to a wide variety of other products. In case of an accident, very specific protocols will need to be followed.

Innovation point

One of the measures that Abengoa applies to all the projects worldwide is the accountant for direct and indirect greenhouse gases (GHGs) to estimate the carbon footprint. This process faces several challenges such as the lack of expertise in this kind of calculations from some of the companies and subcontractors working for a single project. According to the protocols

established by Abengoa, the sub constructor will have a 6 months window to implement a GHG accounting methodology into the company therefore they can report periodically to Abengoa. The implementation of the GHG calculation is signed by the subcontractor into the "Agreement Reporting System of Greenhouse Gases Emissions." In case of failure to implement these measurements in the 6 months period specified, Abengoa will have the right to terminate the contract. The emissions reported will include the direct emission consumption of electricity or thermal energy, as well as indirect emissions associated with goods and services purchased by the supplier towards the completion of the project. This will set up the baseline for GHG emission and will allow the reduction simultaneously, introducing an innovative way to think in collaboration with Abengoa.

8.SUMMARY AND CONCLUSION

In close evaluation of Cerro Dominador, the role and impact of a non-conventional renewable project was observed in the region of Calama, Chile. In conclusion of this report, the project's sustainable performance is rated according to the Envision™ Rating System. Following the rating system, the report identifies the project's strengths and weaknesses in its strive to achieve high scores in its sustainable practices as well as areas in which the project team can improve. The solar power plant represents one of the most innovative attempts to promote a sustainable method of energy generation in Latin America. In the process of its implementations, the project succeeds in providing multiple job opportunities to locals and other professionals. Optimizing the project's location, natural resources, community, and other useful properties, the project team has initiated a project that can impact the way of life for the local community long-term with very little hazards and negative effects. The project takes into consideration several aspects of its phases and procedural impact in order to reduce as much change to the original state of the environment while enhancing the way of life through the implementation of innovative technology and informative methodologies.

Regarding the quality of life, Cerro Dominador aims to implement innovative ways to engage the community and the regional residents in the development and construction of the energy plant and was rated at the highest scoring category of "restorative" in two areas: Stimulate Sustainable Growth & Development and Develop Local Skills and Capabilities. The implementation of a non-conventional renewable project will supply electricity to the population of this area and improve the community quality of life without generating resettlement or affecting the communities protected by special laws. The construction of Cerro Dominador will introduce more than 2000 employments, out of which 60 people will be hired for operation post construction. This has proven to be beneficial in sublimating the negative net

migration pattern in Maria Elena over the years with the modernization of the mine working procedures and reduction of necessary labor. Following the measures proposed at the Environmental Impact Assessment, integration for developmental strategies, promotion of agriculture, small-scale mining, artisanal fisheries, energy and aquaculture in varying territories of the region are set in place. The Antofagasta region will be positioned as a center for research and development in the utilization of sea water for human consumption and productive activities. These initiatives will represent a long-capacitation, scientific knowledge and human capital development which has provided innovation credits to this category. This program will include scholarships for recent graduates, Bachelor's degree offered in solar energy with opportunities to develop a master's program as well as short term courses in concentration solar power.

The project expands upon community engagement by incorporating the importance of the working environment for the workers as well as the locals. A series of actions are implemented in order to prevent and control any potential risks. The workers receive fundamental training, yearly safety protocol simulation, and ongoing instructional support from the construction company. An emergency plan guide developed by the project team is provided on the website. There are security systems to detect and prevent any type of risks associated with procedural tasks. One of the highlighting factors of the project is the convenient site accessibility through preexisting road infrastructure. Other improvements for accessibility include possible bus transportation access to workers and potentially the surrounding locals. The construction of this project will necessitate all the internal and external road works required to ensure security and efficient control over all entry and exit of traffic. However, the project should expand upon ways in which possible light pollution created by the project should be minimized by the use of barriers or integration of some other light strategies. Design for reducing light spillage effects and glare can be also accomplished through the application of full cutoff lenses that direct lighting to where it is needed. The lights should be used in a way that preserves night sky.

The strengths of this project is emphasized by the team's effort to conserve local character and preserve historic and cultural resources throughout the integration of the solar plant. The project's informative development has even on the project have been clearly identified on the Environmental Management Plan as well as the periodicity of the actions that should take place. Also aligned with the principle of infrastructure integration and improvement in efficiency induced a voluntary commitment for developing a scientific publication which revolves around the historical study and spatial analysis of all elements identified in the area of the project site. The publication will contribute to the dissemination of studies focused around industrial heritage and the historical link to exploitation of saltpeter. An important initiative was the assessment of the landscape views prior to the project and the informed aesthetic decisions

based on the assessment.

Cerro Dominador scores high in its establishment of a sustainability management system where the relationship between all involved parties of the project and their aim to emphasize sustainable practices is discussed through collaboration, management, and planning. Control mechanisms for the sustainability management systems are robust and estimated to be sufficient enough to demonstrate changing conditions. The roles of the different members that collaborate on the project have been clearly identified on the Environmental Management Plan as well as the periodicity of the actions that should take place. Also aligned with the principle of infrastructure integration and improvement in efficiency, the project is planning to use an existing transmission line from a nearby source. Due to the early phase of the project, most of the documentation regarding long-term monitoring and maintenance has not been recorded yet. However, the project is comprised of the construction, operation and maintenance of the solar plant, keeping in mind the plan for addressing conflicting regulations and policies as well as extended useful life in all aspects.

In the topic of Resource Allocation, the project is careful in devising several different methods to enhance its overall sustainable practices in the optimization of material use. In efforts to divert waste material from landfills, various strategies are implemented in an effort to minimize the amounts of waste generated: perform segregation at source, optimize the use of resources through reuse or recycling, and ensure minimal environmental impact through final disposal at approved sites. Once the dismantling phase starts, several activities will take place; decommissioning of the solar tower, solar cells and different equipment, facilities and electrical infrastructure; demolition of buildings and other typology of constructions; elimination of foundations; elimination of interconnections and des-urbanization. The highly efficient facility of the plant includes several tanks of high temperature salt storage, which produces electricity for up to 24 hours. The high temperature is used in a steam generator that operates a moving turbine to produce electricity. Additionally, this is a non-conventional energy project that will generate net positive energy through the use of the sun. The project is divided in two different facilities, the solar tower and the photovoltaic plant. Each of them will supply a capacity of 110 MW of renewable energy. The main focus is placed in the protection of freshwater availability, reduction of potable water consumption, and the monitoring of water systems. An assessment of the extraction of freshwater without source replenishment is made in effort to generate a steady decrease in the dependence of water availability.

A very detailed geotechnical study has been conducted and the study consists on 23 drills, which equals 558 linear meters of drilling. From the 23 drills 18 of them were done on the base of the solar tower and 5 on the solar field. A total of 49 mechanical pits were held in the other

sectors of the solar field, which allowed defining a preliminary stratigraphy section of the land where the project is located. This allowed the opportunity to locate the project in a safe area with no adverse geology associated. In the topic of biodiversity, a very detailed study has been conducted to identify the flora and fauna in the area. Based on the provided information, the area has been classified as desert, without any presence of watercourses, which is considered to be an important feature for vegetation growth and species development. As a result, the project will not have a negative effect on native flora. The restoration of the soil where the project has been located is an important practice towards sustainability. This will help to bring the land close to its natural state previous to the development.

Based on the project's emphasis on the production of energy through renewable sources as opposed to the traditional way of energy production, Cerro Dominador will greatly reduce Greenhouse gas emissions. The project team will calculate the greenhouse gas emissions (GHGs) generated by the project as a part of the annual GHG inventory of the company. The implementation of the GHG calculation for all the subcontractors working in Cerro Dominador has given to the project an innovation point in climate and risk category.

Due to the long lifespan of the infrastructure projects, it is important to account for long-term climate change as well as project adaptability for long- term scenarios. Variables such as changing weather conditions, which can create water scarcity, extended drought and heat, heat waves or modification in precipitation should be taken into consideration from the design phase. Following project team specifications, a similar assessment was developed during the design phase to identify the most convenient facility design. A very detailed explanation has been provided on how to evaluate a project from the long-term availability perspective, to go a step further, more specific information should be provided specifically on the project being evaluated "Cerro Dominador".

This report evaluates the sustainability performance of the concentration plant Cerro Dominador project according to the Envision™ Rating System. The report identifies areas in which the project scored highly, as well as low-scoring areas that represent opportunities for which the project team can learn and improve on in future projects, as they strive to achieve sustainable project design and construction methodologies.

APPENDIX:

APPENDIX A: PROJECT PICTURES AND DRAWINGS

Figure 2: Location of the project site area in relation to the communes of María Elena, Sierra Gorda and Calama. Prepared by Google Earth satellite image.
Sources: María José Fernández. *Informe de Inspección Arqueológica Proyecto Solar Cerro Dominador Comuna de María Elena – II Región De Antofagasta*. Chile: December 2013. 5

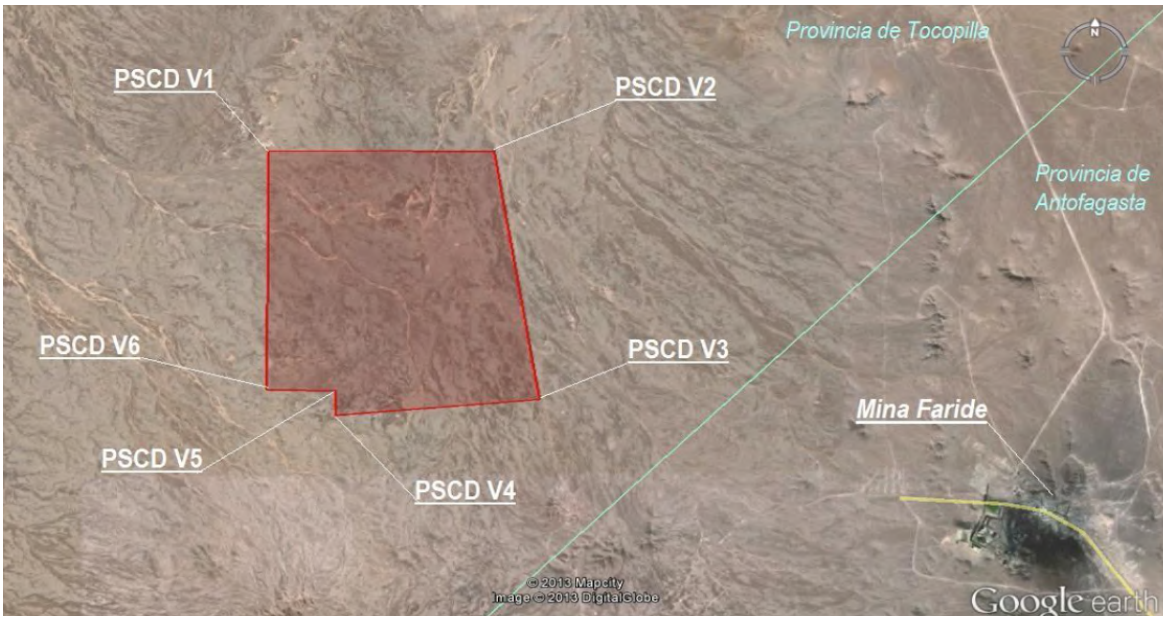

Figure 3: Detail study area and location of vertices. Prepared by Google Earth satellite image
Sources: María José Fernández. *Informe de Inspección Arqueológica Proyecto Solar Cerro Dominador Comuna de María Elena – II Región De Antofagasta*. Chile: December 2013. 11

Figure 4: Abengoa Plant (Sevilla, Spain). Similar to Cerro Dominador
Sources: Sustentable SA. *Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador*. Abengoa Solar Chile. Santiago, Chile: December 2013. 4

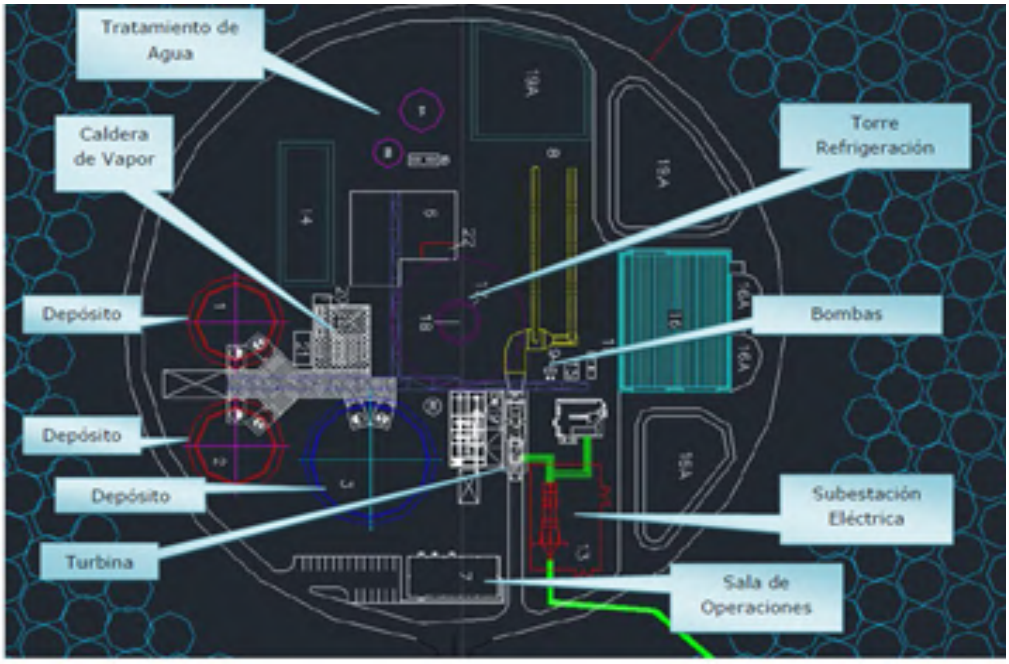

Figure 5: Layout of the "isla de potencia"
Sources: Ruido Ambiental, Servicios de Acústica. *Estudio Acústico Proyecto Planta Cerro Dominador*. Inform for Sustentable SA. Antofagasta, Chile: April 2013. 17

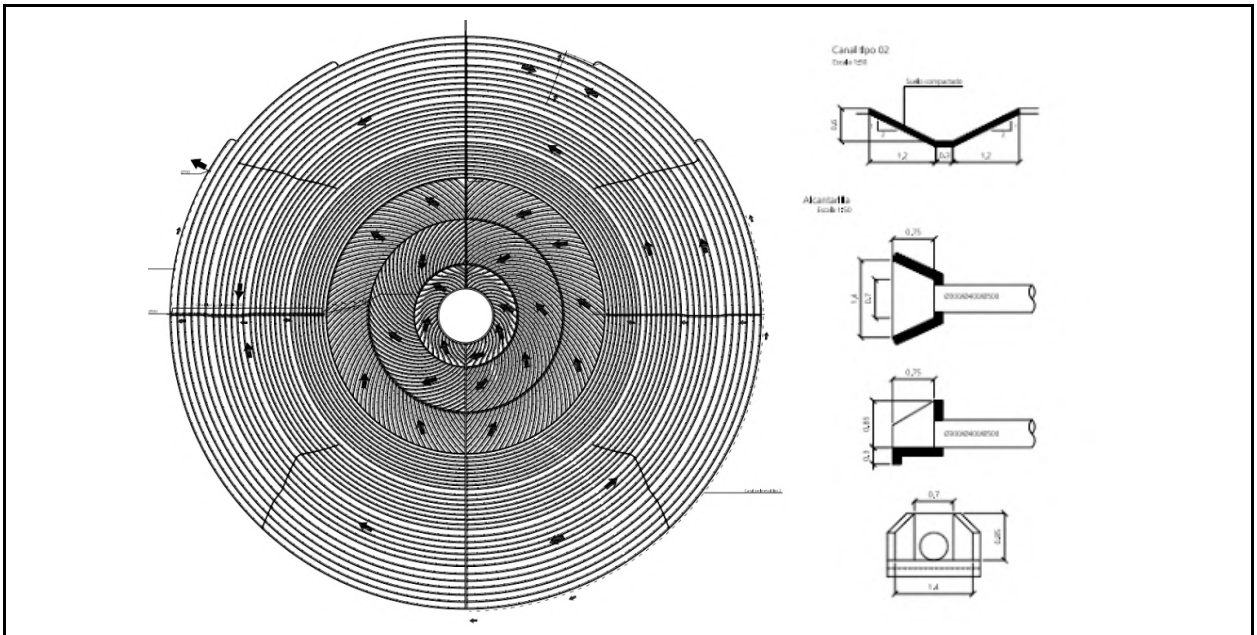

Figure 6: Drainage system
Sources: Abeinsa EPC / Abengoa Solar Chile. Annex from Adenda Nº1. Rain water recollection and conduction system. January 2014.

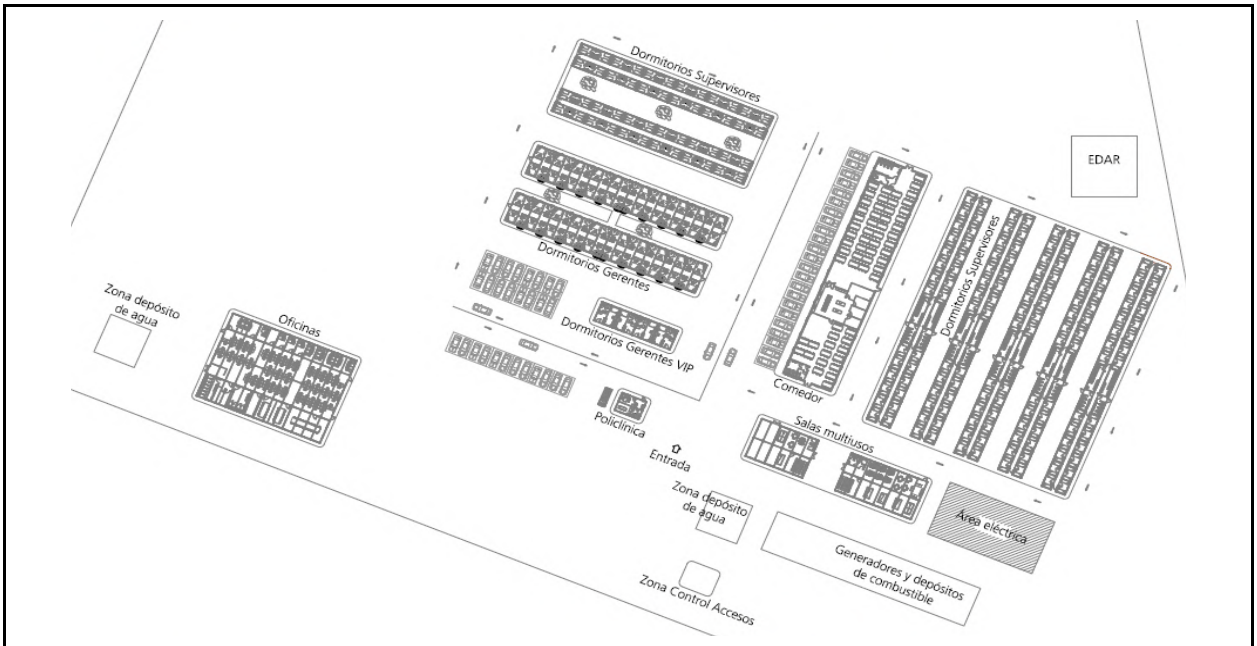

Figure 7: Camp for workers on site.
Sources: Modulcea. Planos Campamento en Chile (Edificios). Client Abener y Teyma. June, 2014.

Figure 8: Identification of the environment and evacuation points.
Sources: Ruido Ambiental, Servicios de Acústica. *Estudio Acústico Proyecto Planta Cerro Dominador*. Inform for Sustentable SA. Antofagasta, Chile: April 2013. 6

Figure 9: Noise simulation during construction
Sources: Ruido Ambiental, Servicios de Acústica. *Estudio Acústico Proyecto Planta Cerro Dominador*. Inform for Sustentable SA. Antofagasta, Chile: April 2013. 18

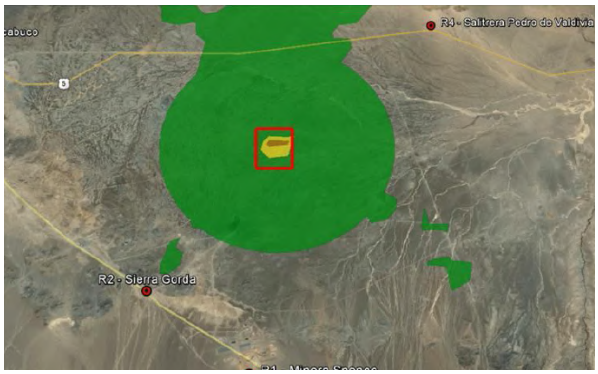

Figure 10: Noise simulation during operation
Sources: Ruido Ambiental, Servicios de Acústica. *Estudio Acústico Proyecto Planta Cerro Dominador*. Inform for Sustentable SA. Antofagasta, Chile: April 2013. 18

Figure 11: Salitrera Pedro de Valdivia, located east of the project and Routes 5 North.
Sources: Ruido Ambiental, Servicios de Acústica. *Estudio Acústico Proyecto Planta Cerro Dominador*. Inform for Sustentable SA. Antofagasta,

Chile: April 2013. 18

Figure 12: Sierra Gorda located on Route 25 south of Calama and east of the project.
Sources: Ruido Ambiental, Servicios de Acústica. *Estudio Acústico Proyecto Planta Cerro Dominador*. Inform for Sustentable SA. Antofagasta, Chile: April 2013. 18

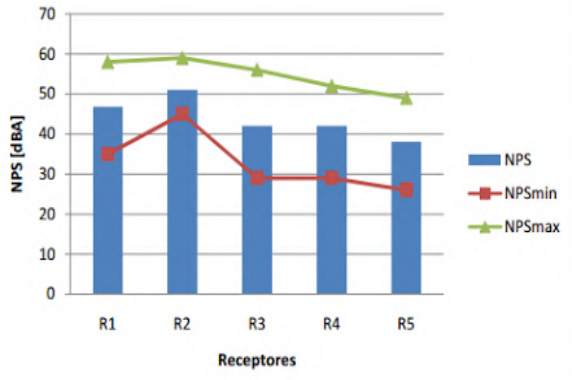

Tabla 2: Niveles medidos en período diurno.

Punto	NPSeq	NPSmín	NPSmáx	Fuentes de ruido
R1	47	35	58	Tráfico ruta 5 norte, viento, animales domésticos.
R2	51	45	59	Tráfico ruta 5 norte, viento, insectos.
R3	42	29	56	Tráfico ruta 5 norte, viento.
R4	42	29	52	Tráfico ruta 5 norte, viento.
R5	38	26	49	Tráfico ruta 5 norte, viento, ruido propio de las viviendas.

Figure 13: Levels measured during the day
Sources: Ruido Ambiental, Servicios de Acústica. *Estudio Acústico Proyecto Planta Cerro Dominador*. Inform for Sustentable SA. Antofagasta, Chile: April 2013. 9 & 10

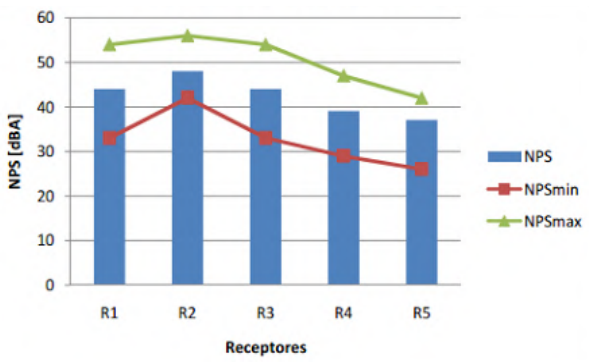

Tabla 3: Niveles medidos en período nocturno.

Punto	NPSeq	NPSmín	NPSmáx	Fuentes de ruido
R1	44	33	54	Tráfico ruta 5 norte, viento, animales domésticos.
R2	48	42	56	Tráfico ruta 5 norte, viento, insectos.
R3	44	33	54	Tráfico ruta 5 norte, viento.
R4	39	29	47	Tráfico ruta 5 norte, viento.
R5	37	26	42	Tráfico ruta 5 norte, viento.

Figure 14: Levels measured during the night
Sources: Ruido Ambiental, Servicios de Acústica. *Estudio Acústico Proyecto Planta Cerro Dominador*. Inform for Sustentable SA. Antofagasta, Chile: April 2013. 10

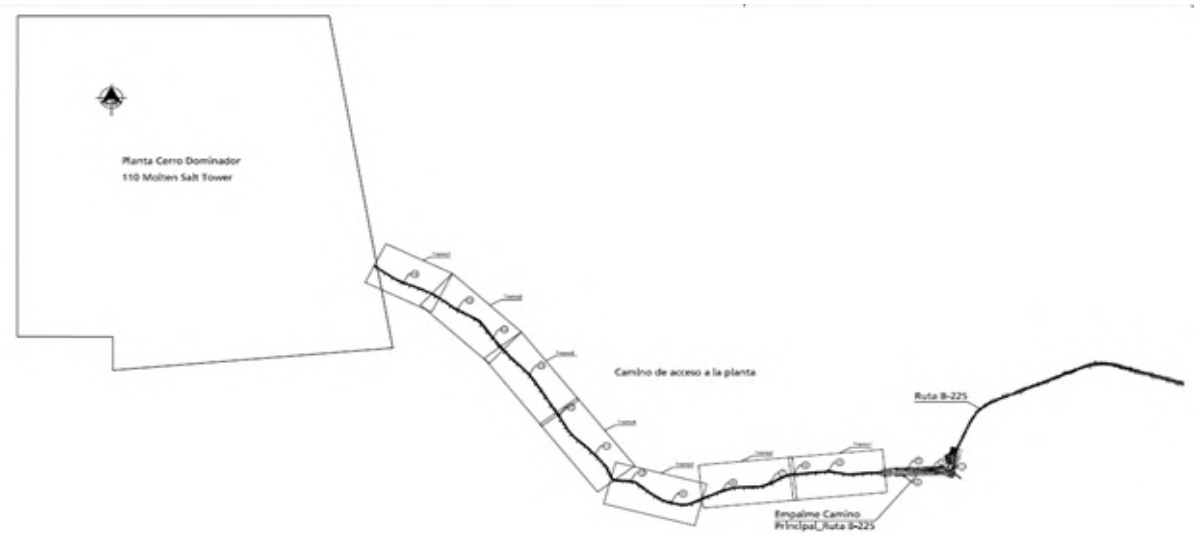

Figure 15: Access to the facility
Sources: Abeinsa EPC / Abengoa Solar Chile. *Camino de acceso a la planta (planta y levantamiento)*. July 2014.

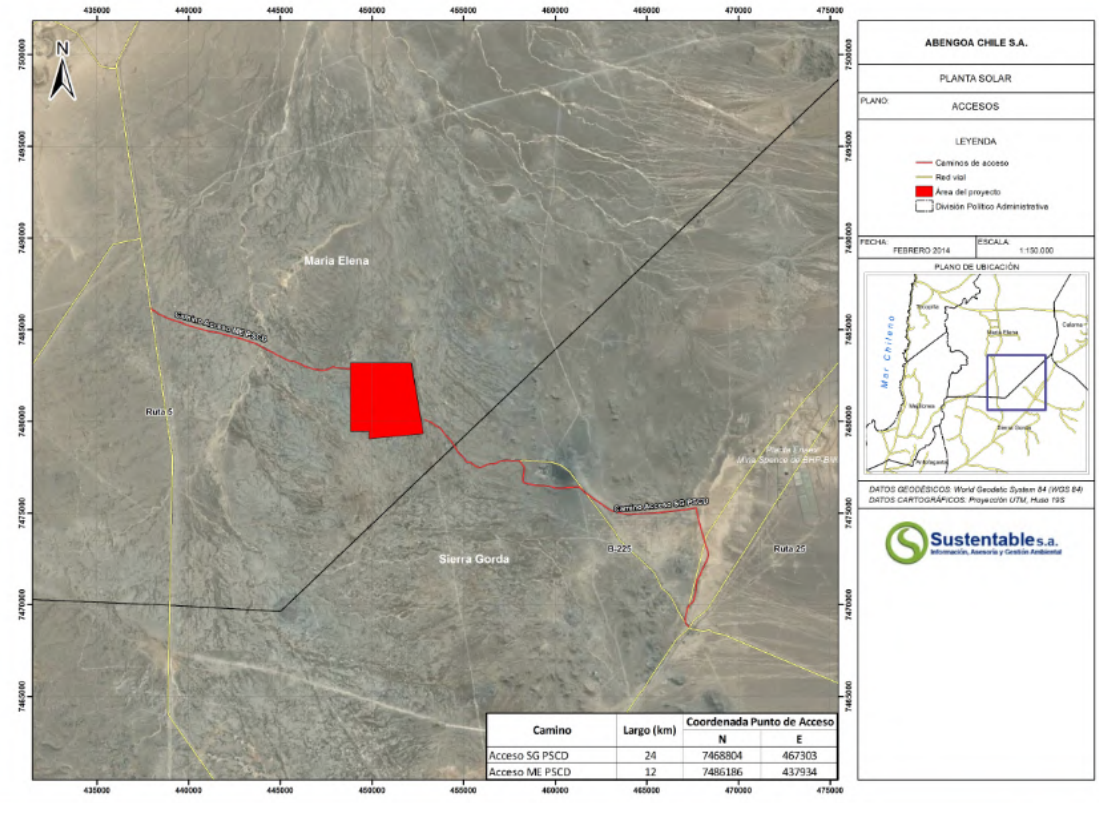

Figure 16: "Figure No. 2-1: general location map and sectors"
Sources: Sustentable S.A. *Informe Biótico Proyecto Planta Solar Abengoa*. By Juan José Sáez y Constanza Méndez. Santiago, February 2013. 3

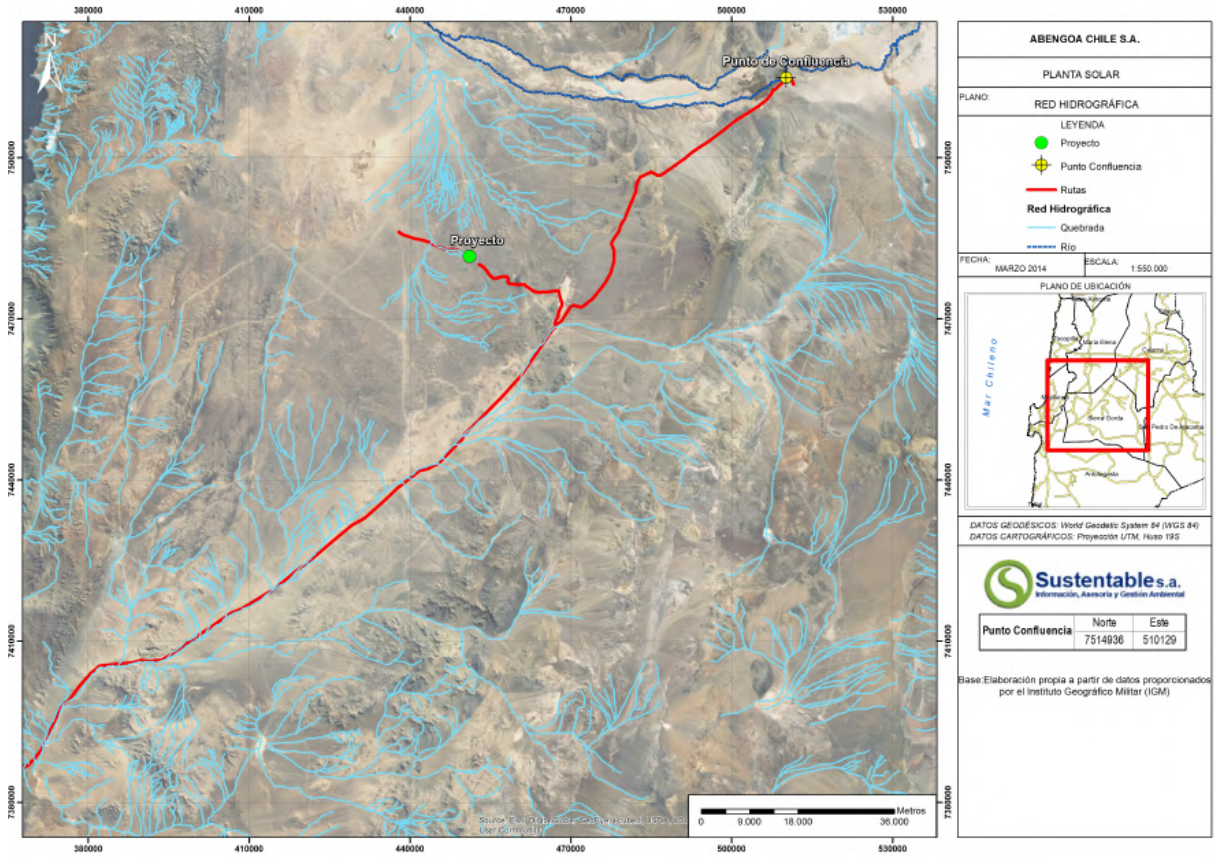

Figure 17: Hydrology on the area
Sources: Abengoa Solar Chile. *Planta Solar Red Hidrográfica*. March 2014.

FICHA DE REGISTRO DE PATRIMONIO CULTURAL

PROYECTO PLANTA SOLAR CERRO DOMINADOR, COMUNA DE MARIA ELENA

Código Sitio: PSCD_ C1

Coordenada Central: 19K 449841 7479157 Altitud: 1522 m.s.n.m

Emplazamiento: Explanada, a los pies de lomajes y cerro

Coordenadas UTM: 19 K 449842 7479190; 19 K 449909 7479131; 19 K 449930 7479086; 19 K 449835 7479079; 19 K 449795 7479132; 19 K 449842 7479190 WGS 84

Vista General:

Descripción General: Campamento de exploración y cateo, ubicado en un área de despeje intencional. Se compone de al menos 11 estructuras pircadas de diferentes funciones, dispuestas de manera nucleada, donde confluyen además huellas de carreta y senderos.

Categoría: Campamento

Dimensiones: 8.620 m2

Adscripción Temporal: Período Histórico

Referencia Bibliográfica: No

Material Cultural Asociado:

Estado de conservación: Regular

Agentes de Alteración: Antrópicas (Huellas vehiculares, reutilización de estructuras)

Observaciones: Abundante material cultural disperso

Registrado por: ASF/LAA/MJF Fecha: 25-ene-13

FICHA DE REGISTRO DE PATRIMONIO CULTURAL

PROYECTO PLANTA SOLAR CERRO DOMINADOR, COMUNA DE MARIA ELENA

Código Sitio: PSCD_E1

Coordenada Central: 19 K 449624 7479549 Altitud: 1594 m.s.n.m

Emplazamiento: Cima de cerro

Coordenadas UTM: 19 K 449615 7479552; 19 K 449629 7479558; 19 K 449640 7479549; 19 K 449633 7479539; 19 K 449618 7479538; 19 K 449615 7479552 WGS 84

Vista General:

Descripción General: Conjunto de 3 estructuras pircadas dispuestas sobre la cima de un cerro de baja altura. Dos paravientos en forma de L (dim:3mx2m y 3mx1m/altura prom.90cm); y una tercera de forma rectagular (dim:1,8mx1,2m y 0,30cm de alto)

Categoría: Estructura Pircada

Dimensiones: 108 m2

Adscripción Temporal: Período Histórico

Referencia Bibliográfica: No

Material Cultural Asociado:

Estado de conservación: Regular

Agentes de Alteración: Natural (derrumbe por sismos)

Observaciones: Existe una visibilidad amplia en 360º.

Registrado por: CA/DG Fecha: 25-ene-13

Figure 18: Annex 3 Record Cards Heritage Cultural.page 1; 2

Sources: María José Fernández. *Informe de Inspección Arqueológica Proyecto Solar Cerro Dominador Comuna de María Elena – II Región De Antofagasta*. Chile: December 2013. Anexos.

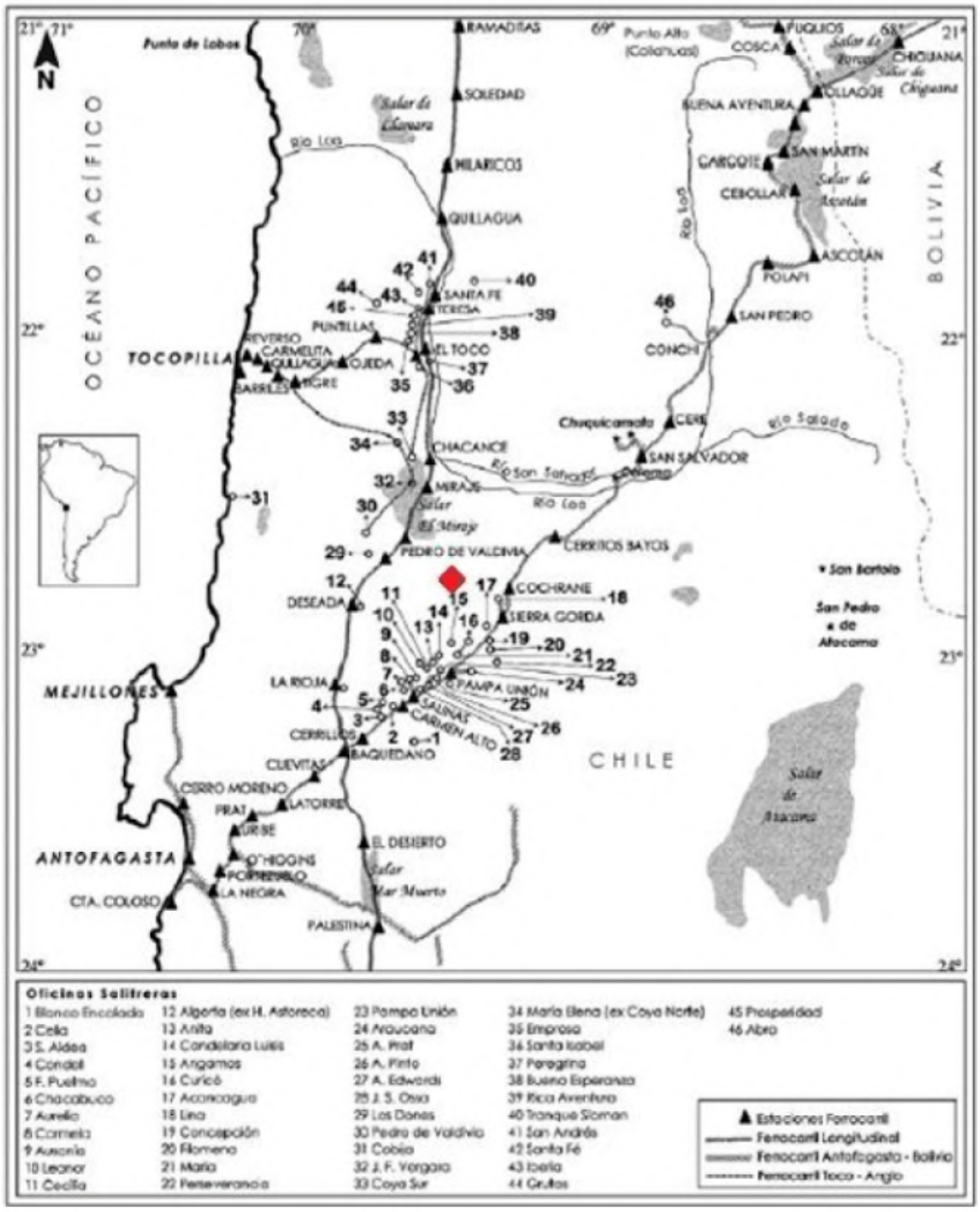

Figure 19: Location Saltpeter mines Cantones, el Toco and Central in relation to the project site area (in red). (Vilches et al 2008.)
Sources: Vilches et al 2008. María José Fernández. Informe de Inspección Arqueológica Proyecto Solar Cerro Dominador Comuna de María Elena – II Región De Antofagasta. Chile: December 2013. 10

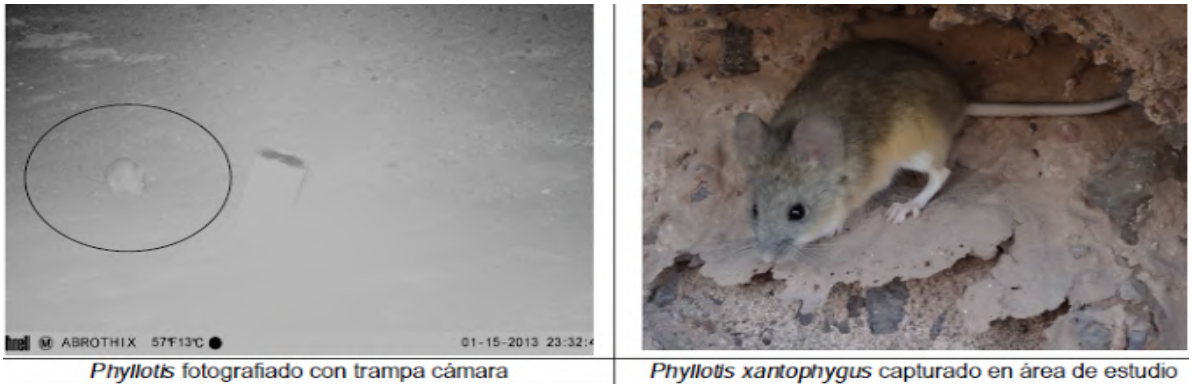

Figure 20: "Figura N° 4-2: Camera Trap "
Sources: Sustentable S.A. *Informe Biótico Proyecto Planta Solar Abengoa*. By Juan José Sáez y Constanza Méndez. Santiago, February 2013. 15

Figure 21: Panoramic site to site area PSCD_S1 Vista. In the background, on the hilltop site is located PSCD_S2
Sources: María José Fernández. Informe de Inspección Arqueológica Proyecto Solar Cerro Dominador Comuna de María Elena – II Región De Antofagasta. Chile: December 2013. Anexo fotográfico.

Figure 22: Overlooking the view shed (north west direction)
Sources: Sustentable SA. Informe de Paisaje Proyecto Planta Solar Cerro Dominador. By Juan José Sáez. Santiago, Chile: February, 2012. 7

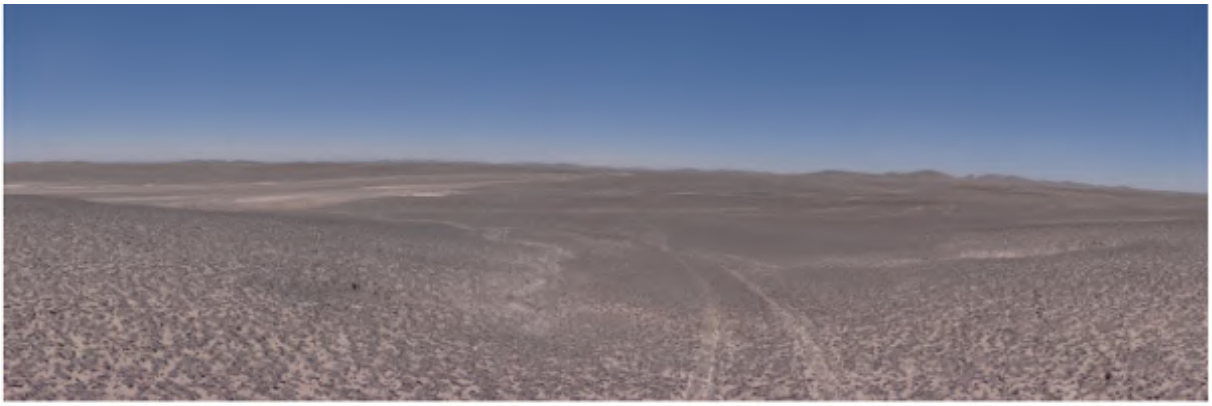

Figure 23: Overlooking the viewshed (Address southeast)
Sources: Sustentable SA. Informe de Paisaje Proyecto Planta Solar Cerro Dominador. By Juan José Sáez. Santiago, Chile: February, 2012. 8

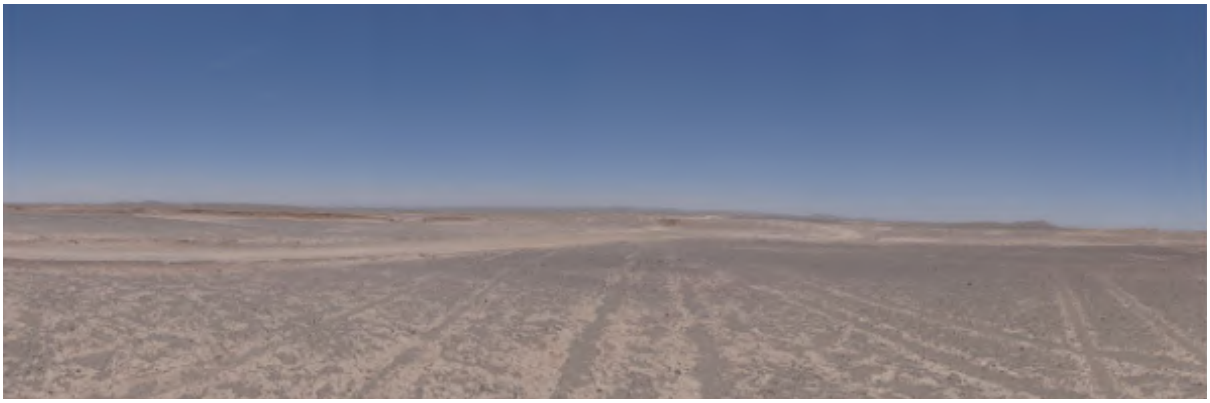

Figure 24: Overlooking the view shed (Address Eastern)
Sources: Sustentable SA. Informe de Paisaje Proyecto Planta Solar Cerro Dominador. By Juan José Sáez. Santiago, Chile: February, 2012. 8

Figure 25: Overlooking the view shed (Northbound)
Source: Sustentable SA. Informe de Paisaje Proyecto Planta Solar Cerro Dominador. By Juan José Sáez. Santiago, Chile: February, 2012. 9

APPENDIX B: ENVISION POINTS TABLE

CREDIT SCORING

				IMPROVED	ENHANCED	SUPERIOR	CONSERVING	RESTORATIVE
1	QUALITY OF LIFE	PURPOSE	QL1.1 Improve community quality of life	2	5	10	**20**	**25**
2			QL1.2 Stimulate sustainable growth and development	1	2	5	13	**16**
3			QL1.3 Develop local skills and capabilities	1	2	5	12	**15**
4		COMMUNITY	QL2.1 Enhance public health and safety	2			**16**	
5			QL2.2 Minimize noise and vibration	1			8	**11**
6			QL2.3 Minimize light pollution	1	2	4	8	**11**
7			QL2.4 Improve community mobility and access	1	4	7	**14**	
8			QL2.5 Encourage alternative modes of transportation	1	3	6	12	**15**
9			QL2.6 Improve site accessibility, safety and wayfinding		3	6	12	**15**
10		WELLBEING	QL3.1 Preserve historic and cultural resources	1		7	**13**	**16**
11			QL3.2 Preserve views and local character	1	3	6	11	**14**
12			QL3.3 Enhance public space	1	3	6	11	**13**
						Maximum points possible:		**181**
13	LEADERSHIP	COLLABORATION	LD1.1 Provide effective leadership and commitment	2	4	9	**17**	
14			LD1.2 Establish a sustainability management system	1	4	7	**14**	
15			LD1.3 Foster collaboration and teamwork	1	4	8	**15**	
16			LD1.4 Provide for stakeholder involvement	1	5	9	**14**	
17		MANAGEMENT	LD2.1 Pursue by-product synergy opportunities	1	3	6	12	**15**
18			LD2.2 Improve infrastructure integration	1	3	7	13	**16**
19		PLANNING	LD3.1 Plan for long-term monitoring and maintenance	1	3		**10**	
20			LD3.2 Address conflicting regulations and policies	1	2	4	**8**	
21			LD3.3 Extend useful life	1	3	6	**12**	
						Maximum points possible:		**121**
22	RESOURCE ALLOCATION	MATERIALS	RA1.1 Reduce net embodied energy	2	6	12	**18**	
23			RA1.2 Support sustainable procurement practices	2	3	6	**9**	
24			RA1.3 Use recycled materials	2	5	11	**14**	
25			RA1.4 Use regional materials	3	6	9	**10**	
26			RA1.5 Divert waste from landfills	3	6	8	**11**	
27			RA1.6 Reduce excavated materials taken off site	2	4	5	**6**	
28			RA1.7 Provide for deconstruction and recycling	1	4	8	**12**	
29		ENERGY	RA2.1 Reduce energy consumption	3	7	12	**18**	
30			RA2.2 Use renewable energy	4	6	13	16	**20**
31			RA2.3 Commission and monitor energy systems		3		**11**	
32		WATER	RA3.1 Protect fresh water availability	2	4	9	17	**21**
33			RA3.2 Reduce potable water consumption	4	9	13	17	**21**
34			RA3.3 Monitor water systems	1	3	6	**11**	
						Maximum points possible:		**182**
35	NATURAL WORLD	SITING	NW1.1 Preserve prime habitat			9	14	**18**
36			NW1.2 Protect wetlands and surface water	1	4	9	14	**18**
37			NW1.3 Preserve prime farmland			6	12	**15**
38			NW1.4 Avoid adverse geology	1	2	3	**5**	
39			NW1.5 Preserve floodplain functions	2	5	8	**14**	
40			NW1.6 Avoid unsuitable development on steep slopes	1		4	**6**	
41			NW1.7 Preserve greenfields	3	6	10	15	**23**
42		LAND & WATER	NW2.1 Manage stormwater		4	9	17	**21**
43			NW2.2 Reduce pesticide and fertilizer impacts	1	2	5	**9**	
44			NW2.3 Prevent surface and groundwater contamination	1	4	9	14	**18**
45		BIODIVERSITY	NW3.1 Preserve species biodiversity	2			13	**16**
46			NW3.2 Control invasive species			5	9	**11**
47			NW3.3 Restore disturbed soils				8	**10**
48			NW3.4 Maintain wetland and surface water functions	3	6	9	15	**19**
						Maximum points possible:		**203**
49	CLIMATE & RISK	EMISSIONS	CR1.1 Reduce greenhouse gas emissions	4	7	13	18	**25**
50			CR1.2 Reduce air pollutant emissions	2	6		12	**15**
51		RESILIENCE	CR2.1 Assess climate threat				**15**	
52			CR2.2 Avoid traps and vulnerabilities	2	6	12	16	**20**
53			CR2.3 Prepare for long-term adaptability				16	**20**
54			CR2.4 Prepare for short-term hazards	3		10	17	**21**
55			CR2.5 Manage heat islands effects	1	2	4	**6**	
						Maximum points possible:		**116**
								803

**The five innovation credits are bonus points and not included in total point tallies*

APPENDIX C: GRAPHS

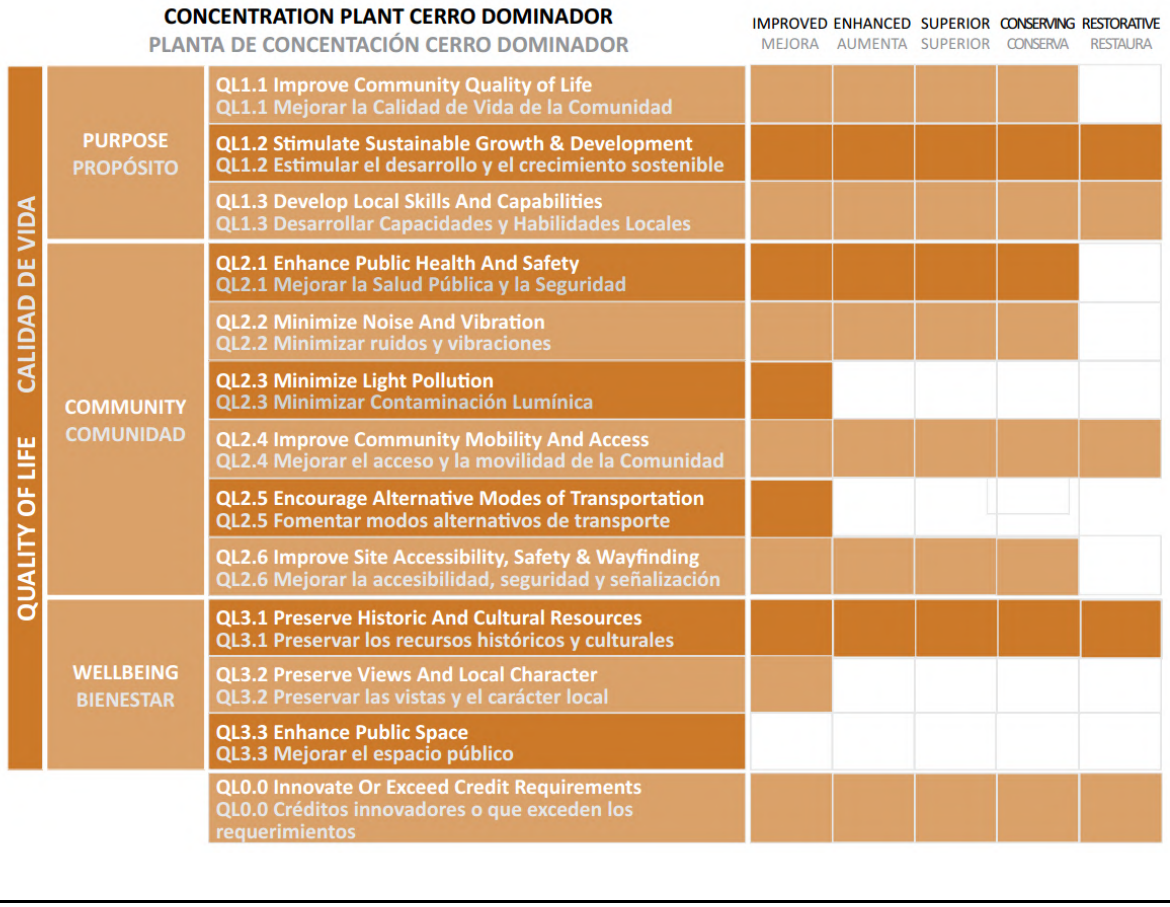

Figure 25: Quality of Life category_ Summary of results

Concentration tower Cerro Dominador, Chile

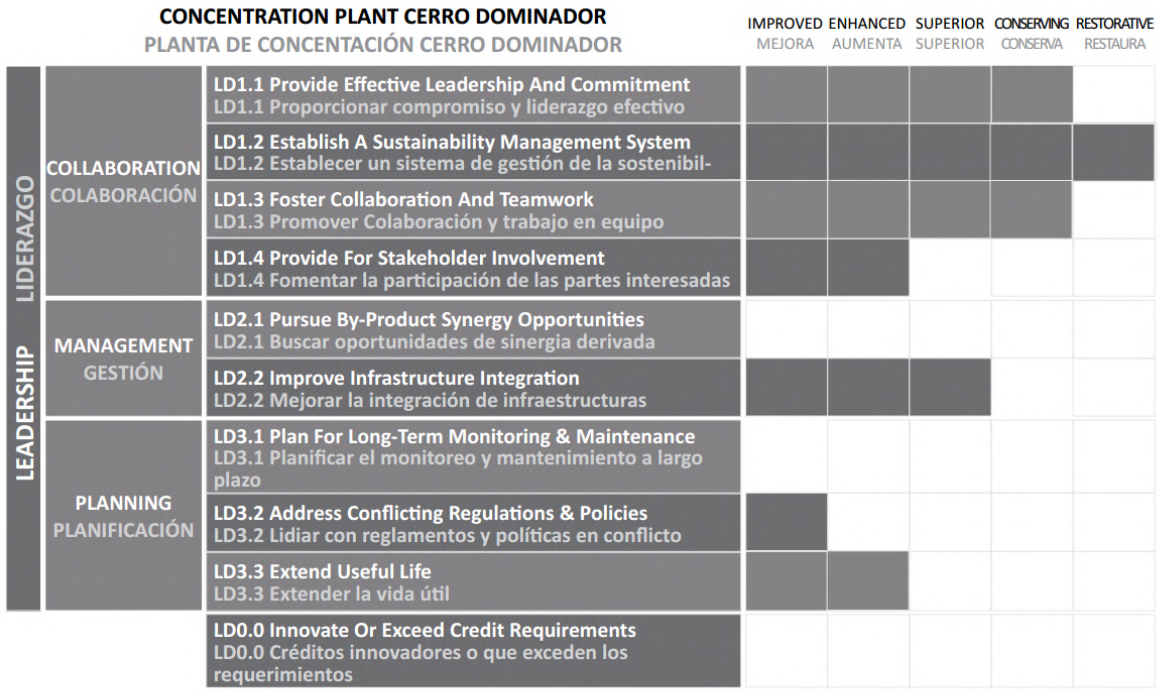

Figure 26: Leadership category_ Summary of results

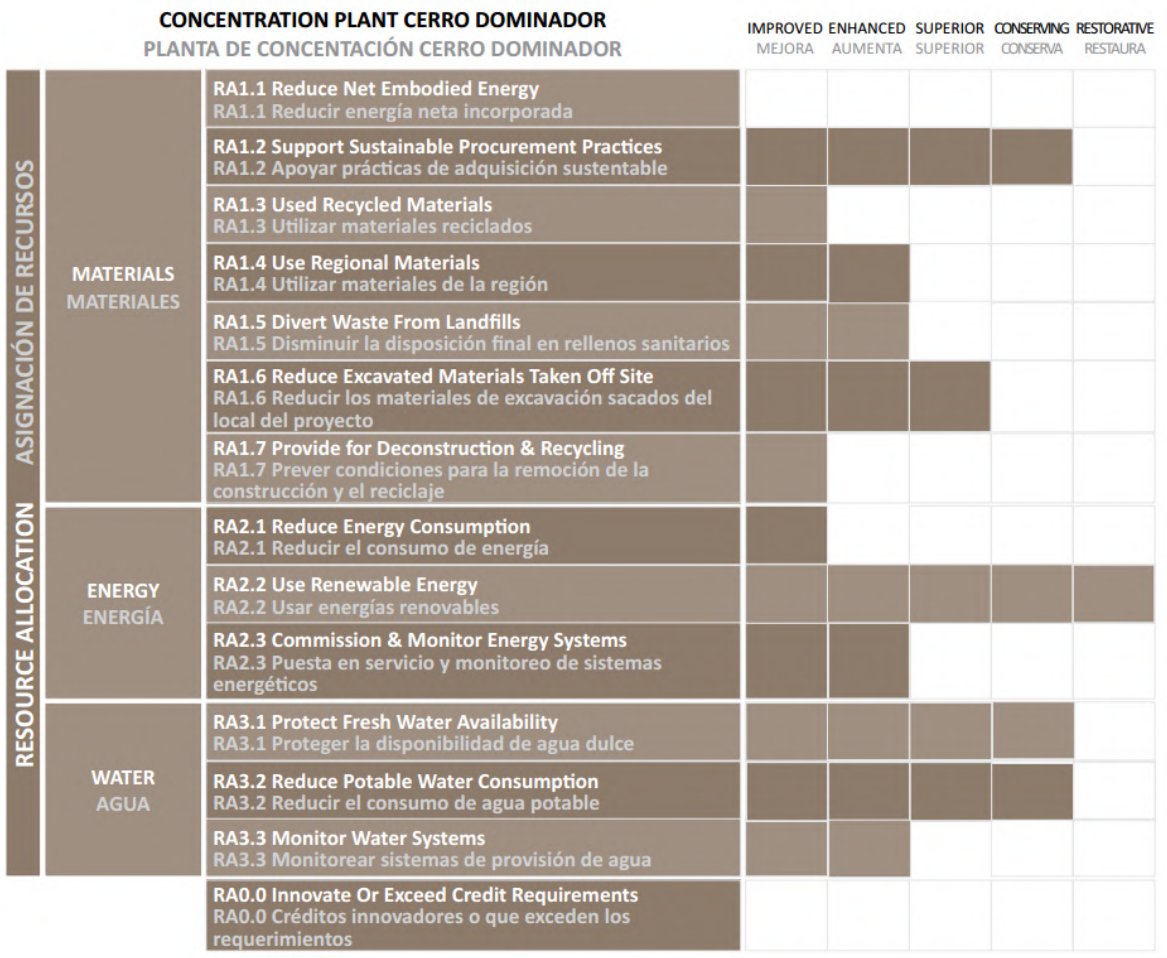

Figure 27: Resource Allocation category_ Summary of results

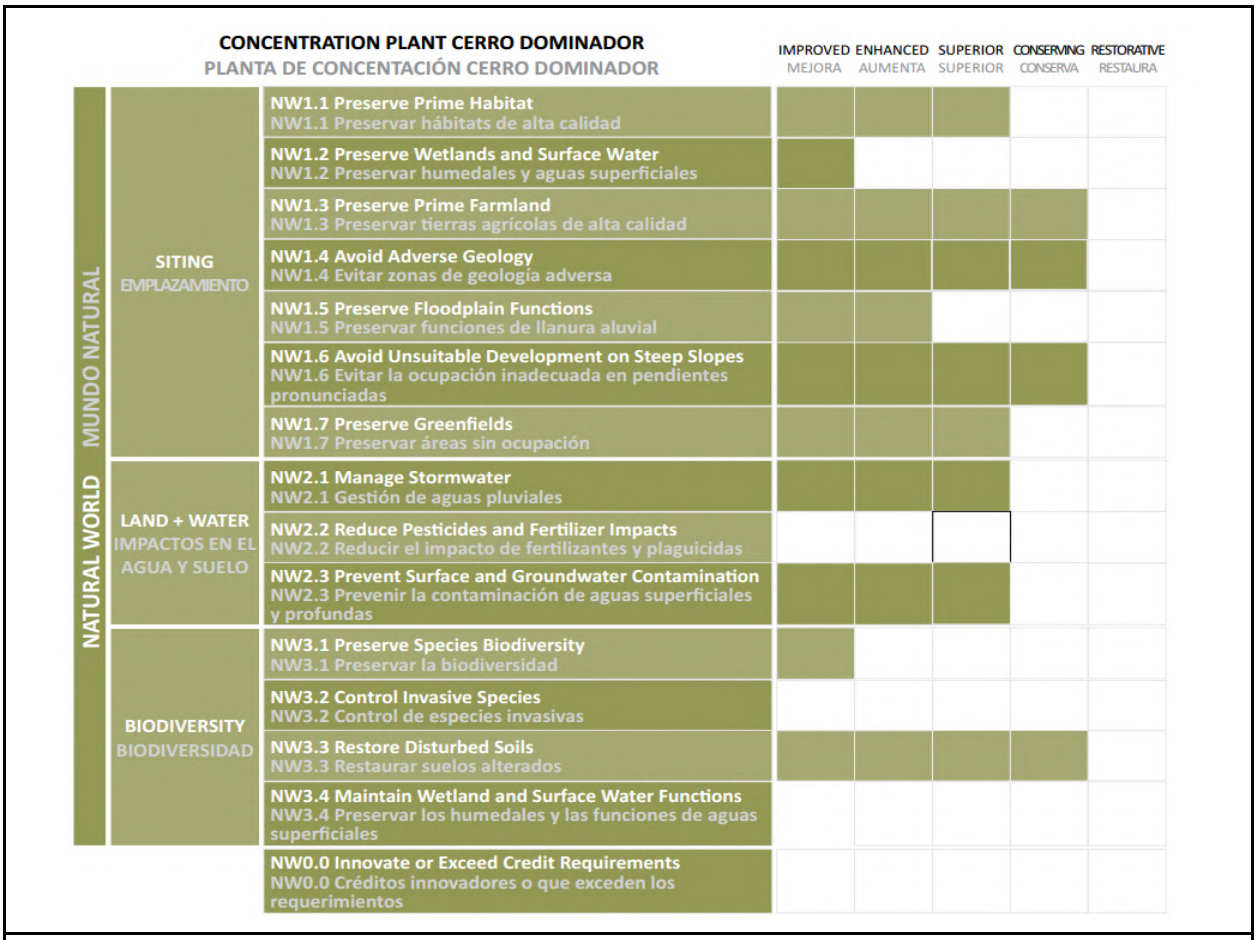

Figure 28: Natural World category_ Summary of results

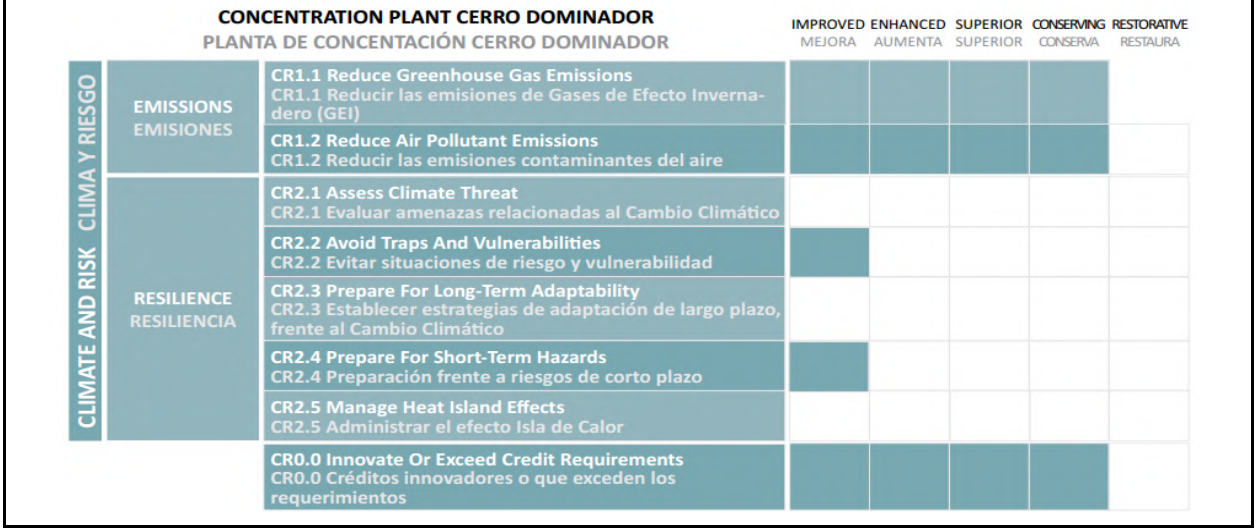

Figure 29: Climate & Risk category_ Summary of results

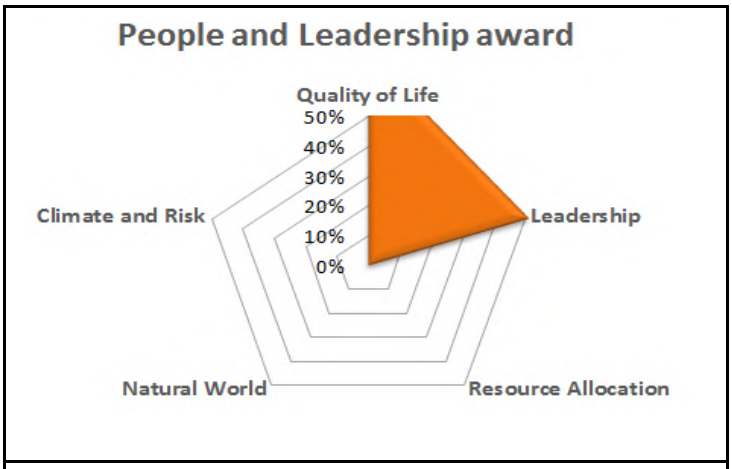

Figure 30: People & Leadership award Summary of results

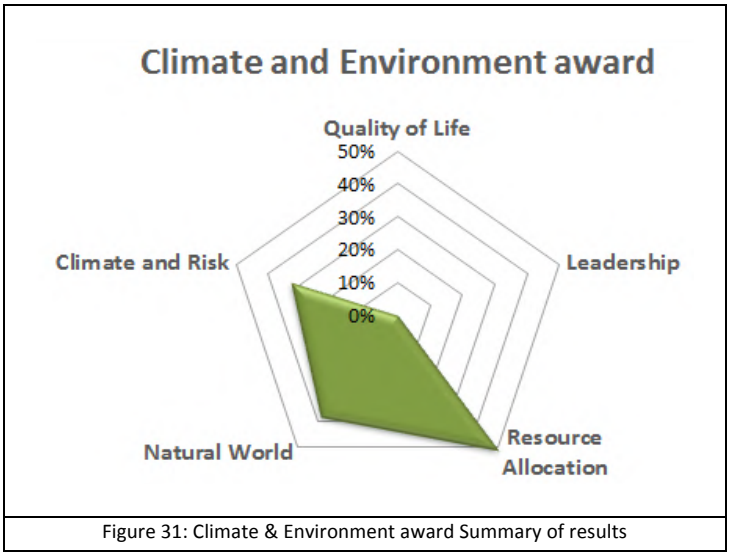

Figure 31: Climate & Environment award Summary of results

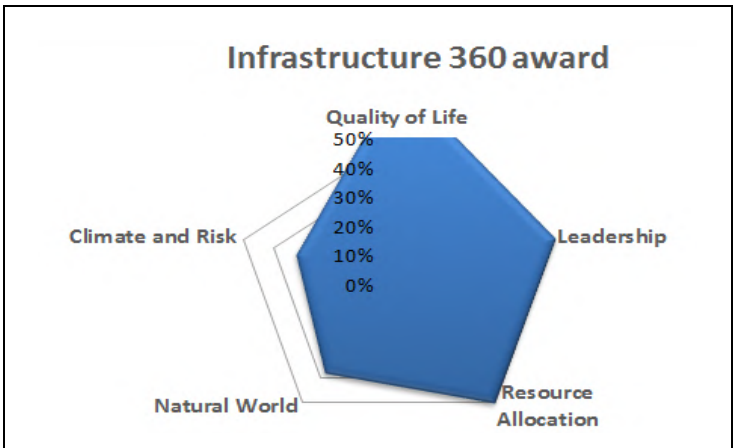

Figure 32: Infrastructure 360 award Summary of results

			CONCENTRATION PLANT CERRO DOMINADOR, CHILE	PT.	Performance
1	QUALITY OF LIFE	PURPOSE	QL1.1 Improve Community Quality of Life	20	Conserving
2			QL1.2 Stimulate Sustainable Growth & Development	16	Restorative
3			QL1.3 Develop Local Skills And Capabilities	15	Restorative
4		COMMUNITY	QL2.1 Enhance Public Health And Safety	16	Conserving
5			QL2.2 Minimize Noise And Vibration	8	Conserving
6			QL2.3 Minimize Light Pollution	1	Improved
7			QL2.4 Improve Community Mobility And Access	14	Restorative
8			QL2.5 Encourage Alternative Modes of Transportation	1	Improved
9			QL2.6 Improve Site Accessibility, Safety & Wayfinding	12	Conserving
10		WELLBEING	QL3.1 Preserve Historic And Cultural Resources	16	Restorative
11			QL3.2 Preserve Views And Local Character	1	Improved
12			QL3.3 Enhance Public Space	0	No score
			QL0.0 Innovate Or Exceed Credit Requirements	8	.
			QL	128	

			CONCENTRATION PLANT CERRO DOMINADOR, CHILE	PT.	Performance
13	LEADERSHIP	COLLABORATION	LD1.1 Provide Effective Leadership And Commitment	17	Conserving
14			LD1.2 Establish A Sustainability Management System	14	Restorative
15			LD1.3 Foster Collaboration And Teamwork	15	Conserving
16			LD1.4 Provide For Stakeholder Involvement	5	Enhanced
17		MNGMT.	LD2.1 Pursue By-Product Synergy Opportunities	0	No score
18			LD2.2 Improve Infrastructure Integration	7	Superior
19		PLANNING	LD3.1 Plan For Long-Term Monitoring & Maintenance	0	No score
20			LD3.2 Address Conflicting Regulations & Policies	1	Improved
21			LD3.3 Extend Useful Life	3	Enhanced
			LD0.0 Innovate Or Exceed Credit Requirements	0	N/A
			LD	62	

			CONCENTRATION PLANT CERRO DOMINADOR, CHILE	PT.	Performance
22	RESOURCE ALLOCATION	MATERIALS	RA1.1 Reduce Net Embodied Energy	0	No score
23			RA1.2 Support Sustainable Procurement Practices	9	Conserving
24			RA1.3 Used Recycled Materials	2	Improved
25			RA1.4 Use Regional Materials	6	Enhanced
26			RA1.5 Divert Waste From Landfills	6	Enhanced
27			RA1.6 Reduce Excavated Materials Taken Off Site	5	Superior
28			RA1.7 Provide for Deconstruction & Recycling	1	Improved
29		ENERGY	RA2.1 Reduce Energy Consumption	3	Improved
30			RA2.2 Use renewable enrgy	20	Restorative
31			RA2.3 Commission & Monitor Energy Systems	3	Enhanced
32		WATER	RA3.1 Protect Fresh Water Availability	17	Conserving
33			RA3.2 Reduce Potable Water Consumption	17	Conserving
34			RA3.3 Monitor Water Systems	3	Enhanced
			RA0.0 Innovate Or Exceed Credit Requirements	0	N/A
			RA	**92**	

			CONCENTRATION PLANT CERRO DOMINADOR, CHILE	PT.	Performance
35	NATURAL WORLD	SITING	NW1.1 Preserve Prime Habitat	9	Superior
36			NW1.2 Preserve Wetlands and Surface Water	2	Improved
37			NW1.3 Preserve Prime Farmland	12	Conserving
38			NW1.4 Avoid Adverse Geology	5	Conserving
39			NW1.5 Preserve Floodplain Functions	5	Enhanced
40			NW1.6 Avoid Unsuitable Development on Steep Slopes	6	Conserving
41			NW1.7 Preserve Greenfields	10	Superior
42		L & W	NW2.1 Manage Stormwater	9	Superior
43			NW2.2 Reduce Pesticides and Fertilizer Impacts	0	No score
44			NW2.3 Prevent Surface and Groundwater Contamination	9	Superior
45		BIODIVERSITY	NW3.1 Preserve Species Biodiversity	2	Improved
46			NW3.2 Control Invasive Species	0	No score
47			NW3.3 Restore Disturbed Soils	8	Conserving
48			NW3.4 Maintain Wetland and Surface Water Functions	0	No score
			NW0.0 Innovate or Exceed Credit Requirements	0	N/A
			NW	77	

			CONCENTRATION PLANT CERRO DOMINADOR, CHILE	PT.	Performance
49	CLIMATE	EMISSION	CR1.1 Reduce Greenhouse Gas Emissions	18	Conserving
50			CR1.2 Reduce Air Pollutant Emissions	12	Conserving
51		RESILENCE	CR2.1 Assess Climate Threat	0	No score
52			CR2.2 Avoid Traps And Vulnerabilities	2	Improved
53			CR2.3 Prepare For Long-Term Adaptability	0	No score
54			CR2.4 Prepare For Short-Term Hazards	3	Improved
55			CR2.5 Manage Heat Island Effects	0	No score
			CR0.0 Innovate Or Exceed Credit Requirements	5	
			CR	40	

Total points	**399**	**0**

APPENDIX D: CREDIT DETAIL

CONCENTRATION PLANT CERRO DOMINADOR: CREDIT SPREADSHEET WITH DETAILS

CATEGORY I, PEOPLE AND LEADERSHIP		
SUB CATEGORY: QUALITY OF LIFE		
	Score	**CONCENTRATION PLANT CERRO DOMINADOR**
QL1.1 Improve Community Quality of Life	**20**	**Conserving** As described on the agreement signed between the Fundación Chile and Abengoa Solar to build local capacities and promote technology transfer, several educational programs are considered, including scholarships for recent graduates to work in a facility from Abengoa worldwide, Bachelor's degree offered in solar energy with opportunities to develop a master's program, and short term courses in concentration solar plant among others. The project aims to improve the community quality of life through the implementation of a non-conventional renewable project that will supply electricity to the population in this area. The project will not however, generate resettlement of the community surroundings or affect groups and communities protected by special laws nevertheless will create a work camp with a capacity for 700 people during the construction phase. Several objectives were identified to be aligned between the project and the nearest communities. Some of these common goals are social integration and improvement of quality of life as well as territorial economic development frame under the regulation La ERD 2009-2020. The measures proposed to achieve these goals are: To ensure access to basic services of water, electricity, sewerage, and quality housing for all residents of the region, with emphasis on less developed areas as well as promoting local employment of laborers. The working plan of the project establishes an understanding that the construction company will build a camp for employees that will exist on site with the capacity for up to 700 people. A Community Development Plan was developed by a consultant company together with the Anofagasta Regional Government (PLADECO, 2010-2014). This plan was implemented in Maria Elena as a tool for strategic planning and management that sets guidelines to achieve community development. Some of these guidelines include strengthening civil society, recovering historical heritage, culture, recreation, education and health. The participation of several stakeholders and authorities was taken into consideration. An example of this is the participation of María Elena´s mayor on the inauguration of the construction, where the Chilean national and local authorities visited Abegoa´s headquarters in Spain. Round tables were created to encourage dialogue within regional authorities as well as to promote innovation and territorial participation. The project was also presented to local authorities and other stakeholders. It was observed that no negotiations with the stakeholders were necessary in order to agree on compensation measures or environmental mitigations (DIA page 84).

		Source: • *Sustentable SA. "Capitulo N3: Otros Antecedentes para evaluar que el proyecto o actividad no requiere presentar un estudio de impacto ambiental, Articulo 5." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 36* • *Sustentable SA. "Capitulo N3: Otros Antecedentes para evaluar que el proyecto o actividad no requiere presentar un estudio de impacto ambiental, Articulo 8." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 41* • *Sustentable SA. "Capitulo N8: Negociaciones con interesados." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 84* • *Abengoa Solar Chile. Registro de actividades. Santiago, Chile.*
		RECOMMENDATIONS A stronger representation of stakeholder's opinion should be taken into account during decision making, showing a closer collaboration between stakeholders and community aside from the authorities. The study conducted to design the Community Development Plan should be presented.
QL1.2 Stimulate Sustainable Growth & Development	**16**	**Restorative** The commune of María Elena has developed a negative net migration pattern over the years, mainly due to the modernization of the mine working procedures, minimizing the need for laborers as well as the closure of Pedro de Valdivia mines of saltpeter in 1996. According to this scenario, this project will represent rebirth of the region by creating new employment, promoting development, enhancing local capacities, and encouraging technology transfer. The construction of Cerro Dominador in this area will have impactful repercussions in the region, creating more than 2,000 employments. Once the construction is concluded, around 60 people will be hired for operation. Based on the working plan of the project, a camp will be developed on the area where 700 residents will be accommodated. The plan acknowledges the agreement that the construction company will build the camp for employees who will live on site. The profile of the active population in Maria Elena is distributed as (49%) working in services strongly related to the mining industry, which directly employs 35% of the community. The measures proposed at the Environmental Impact Assessment are to be integrated in the area for the dissemination of development strategies, encouragement and promotion of agriculture, small-scale mining, artisanal fisheries, energy and aquaculture in the different territories of the region. Considering the typology of project, Non-Conventional Renewable Energy (NCRE), and according to the documentation provided, the intent of the project is to position Antofagasta Region as a research center for non-conventional renewable sources as well as on the utilization of seawater for human consumption and productive activities.

This project will generate huge interest on the region since it is one of the four facilities built in the world with these characteristics. Moreover, it will improve local and country level capacities through technology transfer, representing an asset for the area. As identified in the information provided on the tender proposal Abengoa will collaborate with local institutions to guarantee technology transfer to Chile. This Initiative will be focused in companies and practitioners in Chile and should be done in collaboration with Chilean agencies and education. Abengoa collaborates with Solar Energy Research Chile (SERC-Chile) and several universities to create scientific knowledge and human capital in the areas of solar energy as it interacts with the general public to promote a greater understanding and acceptance of solar energy. This will create a prospect for economic growth and development in the area.

Source:

- *Sustentable SA. "Capitulo 5: Permisos Ambientales Sectoriales." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 75*
- *Sustentable SA. "Capitulo 6: Descripción de Relación entre Proyectos y Políticas, Planes y Programas de Desarrollo Regional y Comunal." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 79*
- *PE y C. "Capítulo 2: 2.1 Aspectos Económicos / Ingresos Económicos". D.5. Formato de Diagnóstico de Sede/País. Focus Abengoa. Santiago, Chile. 6*
- *PE y C. "Capítulo 3: 3.4 Migración". D.5. Formato de Diagnóstico de Sede/País. Focus Abengoa. Santiago, Chile. 11*
- *Abengoa Solar Chile. "Anexo N4: Cronograma de capacitación". Plan de Gestión de Seguridad y Salud Ocupacional Proyecto CSP Atacama 1. Santiago, Chile: August, 2014*
- *Fundación Chile. Acuerdo de entendimiento entre Solar Energy Research center (CERC-Chile) por Fundación Chile y Abengoa Solar Chile S.A. Santiago, Chile: 2013. 1*
- *CORFO. Resolución N°26: Aprueba bases y sus anexos del 'concurso planta térmica de concentración solar de potencia'. Santiago, Chile, 2012. 24*

RECOMMENDATIONS

Identification of the labor market in the area and identifying the patterns of migration of the population once finalize the project.
More detailed specifications of the project impact local tourism

QL1.3 Develop Local Skills and Capabilities	**15**	**Restorative** As described on the agreement signed between the Fundación Chile and Abengoa Solar to build local capacities and promote technology transfer with long-term perspective, several educational programs are considered, including scholarships for recent graduates to work in a facility from Abengoa worldwide, Bachelor's degree offered in solar energy with opportunities to develop a master's program, and short term courses in concentration solar plant among others. In accordance with the project's contributions to promote skills and capabilities on the area, it is important to mention that the workers hired will receive ongoing training from the project staff. The project will hire 700 workers on average during construction and approximately 2,000 workers at its peak. Labor associated with the operation of the project is 50 to 70 people maximum. The training that all employees will receive covers significant environmental aspects, waste management, management of hazardous substances, and environmental emergencies contingency management. Employees must have specific knowledge on the work that they are developing as to be aware of their impact and to minimize the risks associated with that process. Workers will be informed of the waste management classification defined in three major types: household, industrial and hazardous. They will also learn how to handle, identify, and store hazardous substances as well as the procedures to follow in case of oil spills and fires among other emergencies. One of the more influential examples of local capacitation are the programs for implementation of emissions calculation associated with the operations of the different subcontractors. To have this emissions account in place is one of the requirements for employment as an Abengoa´s subcontractor. Abengoa will provide technical support and a 6 months margin to implement the emissions accountant into the company procedures. Following the agreement signed between Fundación Chile and Abengoa Solar Chile, both parties will work towards achieving a high level capacitation at several universities that will promote the exchange of knowledge from international companies working in Chie like Abengoa to local companies. This will increase the long-term competitiveness of local companies and the country in general.
		<u>Source:</u> *• Sustentable SA. "Capitulo 2: Descripción del proyecto." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 24* *• Abeinsa EPC & Abengoa Chile. Plan De Manejo Ambiental: Proyecto Planta Solar Cerro Dominador. By Francisco Valverde. Santiago, Chile: July, 2014. 19-20* *• Abengoa Chile. GEI-PE 003: Determinación de las Emisiones de GEI de los Bienes y Servicios suministrados a Abengoa Chile / Emisiones de alcance 3. By Karen Garrido. Santiago, Chile: February, 2013.* *• Fundación Chile. Acuerdo de entendimiento entre Solar Energy Research center (CERC-Chile) por Fundación Chile y Abengoa Solar Chile S.A. Santiago, Chile: 2013. 1* *• CORFO. Resolución N°26: Aprueba bases y sus anexos del 'concurso planta térmica de concentración solar de potencia'. Santiago, Chile, 2012. 24*
		<u>RECOMMENDATIONS</u> It is recommended to train and integrate into the project process some of the minorities and disadvantaged groups in the region such as women. It has been identified certain positions that are expected to be covered by women according to the project team, but no information according to it has been provided.

QL2.1 Enhance Public Health And Safety	**16**	**Conserving** The project presents no risk to the community due to its distance (15 km) from the closest communities, nonetheless, the company is committed to provide further analysis to identify any possible risk associated to the project and to develop the necessary actions to prevent and control any potential risk detected. Some of the actions that the construction company is planning to implement include fundamental training and ongoing instructional support of the staff, especially the new workers. Another prevention that will oversee the risk management is the emergency plan guideline on the site that was developed by the project team. This plan will incorporate security systems to detect and prevent any type of risks associated with the procedural project tasks. Further guidance to control other environmental aspects such as noise, emissions, etc. will also be provided in the plan. As specified on the Risk Management Plan, Occupational Health Risk and all other risks associated with daily tasks are analyzed before starting the work, which enables the workers to fully prepare for the specific activity, reducing most associated risks. Some of the health and safety protocols conducted are yearly scenario simulation with the Office of Civil Protection and Emergency (IDNDR), Police and Fire Dept., Samur and other members who may be involved in case of an unexpected event. Fundamental training to optimize the purpose of the simulation will be held and the Secretaría Regional Ministerial de Chile of Transport and Telecommunications (SEREMI) will be notified 30 days in advance. Upon completion of the simulacrum, official report of the exercise will be delivered. <u>Source:</u> • *Abengoa Solar Chile. "Capitulo IV: Elementos – Herramientas de Gestión." Plan de Gestión de Seguridad y Salud Ocupacional Proyecto CSP Atacama 1. Santiago, Chile: August, 2014* • *Abengoa Chile. Plan de Contingencia para el Transporte de Sustancias. Chile. 7* • *Sustentable SA. Adenda N°1 Declaración De Impacto Ambiental Proyecto Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: February, 2014. 16, punto F* • *Abengoa Chile. Departamento de Prevención de Riesgos. Estándar de seguridad para inspección mensual de equipos críticos. Chile: September, 2008* • *Abengoa Chile. Procedimiento General de Seguridad y Salud en el Trabajo: Reglamento Especial para Contratistas y Subcontratistas. By Leonardo Virán, Carolina Zuniga, and Juan C. Lopez. Santiago, Chile: October, 2010* • *Abengoa Chile. Departamento de Prevención de Riesgos. Estándar de seguridad N°24: Flujograma de accidentes. Santiago, Chile: October, 2010* • *Abengoa Solar Chile. "Anexo N4: Cronograma de capacitación". Plan de Gestión de Seguridad y Salud Ocupacional Proyecto CSP Atacama 1. Santiago, Chile: August, 2014* <u>*RECOMMENDATIONS*</u> Identification of non-conventional risks associated to the construction of the project or evidence of the modification of some specific aspects of the project due to the analysis of the risks associated.

QL2.2 Minimize Noise And Vibration	**8**	**Conserving** As identified in the provided project documentation, the project does not generate harsh noise and vibration that may disturb the local population. The plant is located West of Route 25 and east of Route 5 North, outside city limits, South of Calama. The closest populated area is Sierra Gorda, located 17 km away from the project site. During the construction phase, the project will generate noise from the use of traditional processes machinery construction (backhoe, truck vehicles to transport and dump materials, etc.). To assess noise emissions, a study was conducted to identify potential receptors, baseline measurement noise, estimation and modeling of acoustic emissions and analysis of compliance with applicable regulations. Sensitive noise areas, calculated by a noise measuring software, have been identified for noise control during construction. The measures were recorded both during the day and at night. According to this study, it was estimated that the sound pressure levels projected meet regulatory limits S.D. 38/11 of both MMA period day and night, in both stages of the project, thus no mitigation measures are necessary.
		Sources: • *Sustentable SA. "Capitulo 2: Descripción del proyecto." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 24* • *Sustentable SA. "Capitulo 2: Descripción del proyecto." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 30* • *Sustentable SA. "Capitulo 3: Otros antecedentes para evaluar que el proyecto o actividad no requiere presentar un estudio de impacto ambiental." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 36-39* • *Ruido Ambiental, Servicios de Acústica. Estudio Acústico Proyecto Planta Cerro Dominador. Inform for Sustentable SA. Antofagasta, Chile: April, 2013*
		RECOMMENDATIONS To get higher level of achievement in this credit, will be required to prove that the level of noise and vibration in the area have decreased after the completion of the project. This will represent the creation of quieter communities.
QL2.3 Minimize Light Pollution	**1**	**Improved** As specified by Envision, well-designed lighting can maintain adequate levels of light on the ground and reducing light pollution by utilizing efficient lighting systems. The importance of the preservation of the dark sky has been identified in compliance to Decreto N° 43/2012 Norma de emisión para la regulación de la contaminación lumínica that recently modified Decreto Supremo Nº 686/99. The Adenda N1 has integrated new measures to adjust the project to the new requirements. It has been stated on the information provided that the light used should comply with the emission limits, which must be certified by a laboratory approved by the SEC, as noted by the standard. Moreover, the company will inform the related authorities regarding the number of lighting units to be installed and will deliver a copy of the certificates issued by the lab authorized by the SEC.

		Source: *• Sustentable SA. "Capitulo 4: Antecedentes para evaluar el cumplimiento de las normas ambientales." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 59* *• Sustentable SA. Adenda N°1 Declaración De Impacto Ambiental Proyecto Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: February, 2014. 19*
		RECOMMENDATIONS The possible light pollution created by the project should be minimized by the use of barriers or integration of some other light strategies. Design for reducing light spillage effects and glare can be also accomplished through the application of full cutoff lenses that direct lighting to where it is needed. The lights should be used in a way that preserves night sky.
QL2.4 Improve Community Mobility And Access	**14**	**Conserving**
		The project site is located on a rural area close to María Elena´s commune, approximately 60 km away from Calama´s city. The main access to the project site is through public roads (Routes 5 and 25) where the route continues onto a 20,9 km stretch of existing road. The pre existing road infrastructure has been one of the highlighted reasons for implementing the project in this area for the convenient site accessibility. 2000 people will be employed during the construction peak time, out of which 700 will live in the construction camp housing. This strategy will prevent traffic congestion in the area improving community livability. To improve mobility and access for the workers who commute to the site every day, several improvements are being proposed to the existing unpaved paths. These improvements will ease the communication in the area reducing by half the travel time for the employees coming from Santa Elena. Base on the information provided, the project team has coordinated access permits with certain owners and local authorities such as DOM Municipios, SAG, Depto de Rentas y Patentes Municipios, Dirección de Vialidad from the Abenga for access to and utilization of specific areas of the existing infrastructure.
		Source: *• Servicio de Evaluación Ambiental, Gobierno de Chile. Resolución Certificación Ambiental N°0231. Antofagasta, Chile: April, 2014. 6* *• Abegoa Solar Chile. Matriz de Permisos de Proyectos CSP CD 110.* *• Dirección de Vialidad, Ministerio de Obras Publicas, Gobierno de Chile. ORD N°1349. Carta N 0951/14. Materia: Diseño para acceso en Ruta 25 y Ruta B-225 para Proyecto Planta Solar Cerro Dominador. Antofagasta, Chile: August, 2014*
		RECOMMENDATIONS
QL2.5 Encourage Alternative Modes of Transportation	**1**	**Improved**
		The Adenda N-1 references a bus company that will privately transport workers to the construction site. Several invoices from Sociedad Transportes Santa Angela L and pictures show evidence the arrangement done by Abengoa to transport workers from the nearby locations to the facility. As specified the company will comply to DS No. 80/2004 of the Ministry of Transport and Telecommunications. To minimize the amount of employees commuting to the area every day, a camp housing with

		a capacity to accommodate 700 residents will be built on site. There are no public communities nearby that will benefit from the increase of walkability surrounding the project site. No plans for further action regarding alternative modes of transportation are considered at this point.
		Source: • *Sustentable SA. Adenda N°1 Declaración De Impacto Ambiental Proyecto Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: February, 2014. 22* • *Abengoa Chile. Factura #4500593881 Transportes Santa Angela L. Chile: 2014.* • *Abengoa Chile. Factura #4500614450 Transportes Santa Angela L. Chile: 2014.* • *Abengoa Chile. Factura #4500623570 Transportes Santa Angela L. Chile: 2014.* • *Abengoa Chile. Factura #4500648572Transportes Santa Angela L. Chile: 2014.* • *Abengoa Chile. Factura #4500593881 Transportes Santa Angela L. Chile: 2014.*
		RECOMMENDATIONS Verify the possibility to implement non-motorized transportation within the facility of the surrounding areas, for example considering solar/electric busses for moving workers in and out.
QL2.6 Improve Site Accessibility, Safety & Wayfinding	**12**	**Conserving** The project involves both internal and external accesses considering different measures to improve safety and security in the area. For external access to the site, adapting an existing road of compacted soil is considered. Internally, there will be a paved road to access the different points of the solar plant. The improvement of site accessibility and wayfinding also includes the installation of signaling and safety systems. The project is surrounded by a perimeter fence already installed onsite, providing protection and safe monitoring of work in progress. The fence will be of standard 2.0 m height reinforced 20cm underground all around the solar field perimeter. The construction of this work will necessitate all the roadwork's required to ensure security and efficient control over entry and exit traffic. Access control and safety lighting by the gate will provide appropriate illumination levels and allow the gate camera to identify visitors clearly. The camera will capture identification of the vehicles accessing the area and must be protected from ambient conditions. The convenient accessibility and navigation of the site has been sufficiently identified, following simple and readable signals commonly understood by drivers. The entrance, exits and circulation as well as the maximum speed in each of the sections of the road are marked.

		Source: *• Sustentable SA. "Capitulo 1: Antecedentes Generales." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 9* *• Dirección de Vialidad, Ministerio de Obras Publicas, Gobierno de Chile. ORD N°1349. Carta N 0951/14. Materia: Diseño para acceso en Ruta 25 y Ruta B-225 para Proyecto Planta Solar Cerro Dominador. Antofagasta, Chile: August, 2014* *• Abengoa Chile. Accesibilidad, seguridad y señalización Proyecto: CSP Atacama 1.* *• Abengoa Chile / Abeinsa EPC. Plan de emergencia 'Proyecto Termo Solar de generación de energía eléctrica CSP 110 MW Cerro Dominador'. By Carolina Roblero and Francisco Valverde. Chile: July, 2014* *• Servicio de Evaluación Ambiental, Gobierno de Chile. Resolución Certificación Ambiental N°0231. Antofagasta, Chile: April, 2014. 6*
		RECOMMENDATIONS Identify the net benefit to the area where the project is located as well as the improvements in site accessibility, safety beyond the construction site.
QL3.1 Preserve Historic and Cultural Resources	**16**	**Restorative** A very detailed archaeological inspection including a comprehensive mapping methodology has been conducted on site to analyze possible findings in the area, leading to several discoveries of historic interest. Most of the elemental discoveries of the site trace back to exploitative mining residues of saltpeter and nitrate from between late 19th century to early 20th century. A total of 35 historic archaeological entities and 192 wells for caliche are located in this area. None of these elements have been identified as unique since all the previous elements have been distributed among a larger area of influence. Nevertheless, the project team implemented some initiatives before and during the construction phase such as the creation of a detailed record identifying asset and liability (surveying, description in detail and photographic record), as well as tracking any linear features for every 300 meters. The collection of surface material has not been necessary but the support of archeologist will continuously be requested in the area. The project's informative development has induced a voluntary commitment to develop a scientific publication revolving around the historical study and spatial analysis of all elements identified in the area of the project site. The publication will contribute to the dissemination of studies focused around industrial heritage and the historical link to exploitation of saltpeter.

		Source: *• Sustentable SA. "Capitulo 3: Otros antecedentes para evaluar que el proyecto o actividad no requiere presentar un estudio de impacto ambiental." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 44-45* *• Fernández, María José. "Anexo 1 Registro Fotográfico General." Informe de Inspección Arqueológica Proyecto Solar Cerro Dominador Comuna de María Elena – II Región De Antofagasta. Chile: December, 2013. 23* *• Fernández, María José. "Anexo 2 Detalle Localización de Pozos Calicheros." Informe de Inspección Arqueológica Proyecto Solar Cerro Dominador Comuna de María Elena – II Región De Antofagasta. Chile: December, 2013. 27* *• Fernández, María José. "Anexo 3 Fichas de Registro Patrimonio Cultural." Informe de Inspección Arqueológica Proyecto Solar Cerro Dominador Comuna de María Elena – II Región De Antofagasta. Chile: December, 2013. 31*
		RECOMMENDATIONS
QL3.2 Preserve Views and Local Character	**1**	**Improved** A landscape assessment has been developed to analyze the impact on the views and local character in the area. The main intent of this report is to characterize the landscape in the area considering physical components, biotic and anthropic components, identification and description of visual quality and landscape fragility, identifying the different degrees of visibility that presents the landscape of the area of influence. After the assessment, the project has not identified any negative impact on the local communities. There are traces that show alterations on the landscape due to previous mining operations as well as added power lines and renovated paths. According to the documentation provided, the project will not obstruct visibility on areas of importance to the community, interfere with local character or affect tourist value. Despite the low population of this area, small measures have been implemented to ensure no landscape view is impacted or disturbed. The line structures that are located within 500 meters from the public road and the external closure should be painted with colors with chromatic harmony with the surrounding landscape. Roads that are expected be obsolete after the construction should be returned to its natural state. It has been specified that the contractor should avoid the use of strong colors with high contrast on the surrounding landscapes.
		Source: *• Sustentable SA. "Capitulo 3: Otros antecedentes para evaluar que el proyecto o actividad no requiere presentar un estudio de impacto ambiental." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: Diciembre, 2013. 43-44* *• Sustentable SA. Informe de Paisaje Proyecto Planta Solar Cerro Dominador. By Juan José Sáez. Santiago, Chile: February, 2012*
		RECOMMENDATIONS The opinion of local decision- makers or the population according to the visual impact of the project will be very useful to determine the public acceptance.
QL3.3	**0**	**No score**

Enhance Public Space		Several measures have been evaluated by the project team regarding the enhancement of public spaces. However, due to the early phase of the projects, no information has been provided at this point.
		Source: *N/A*
		RECOMMENDATIONS *Even though the project is not located within an urban area or close by one, it is recommended the generation of public spaces. The main intent of these public spaces is to create spaces for integration, education at the same time that eases the acceptance of the project by the local communities. By creating this initiatives the project team is seen as a part of the same community that cares about it instead of foreigners on the area*
QL0.0 Innovate Or Exceed Credit Requirements	**8**	The project has shown an outstanding performance on long-term capacitation, scientific knowledge and human capital development. This commitment was shown early on during the project bid. Capacity building and technology transfer was one of the sections of the proposal. The programs proposed are "Associative Chilean Universities Program for Training Futures Professionals and Specialists in Solar Technology", "Collaboration Agreement UTFSM and Focus Abengoa", "Fundación Chile" Agreement, "Cooperation Program with Universities and Research Centers National for Knowledge Transfer". As described on the agreement signed between the "Fundación Chile" and Abengoa Solar, the programs will integrate several elements: scholarship for recent graduates, to work on a facility from Abengoa worldwide. Bachelor degree in solar energy with opportunities to develop a master program. Short term courses in concentration solar plant. Other different programs provide the opportunity to develop a post-professional thesis or create funded R&D opportunities among others. All these initiative will undoubtedly help to develop better professional on the field who will drive the change towards a more sustainable energy matrix in Chile. *Sources:* • Fundación Chile. Acuerdo de entendimiento entre Solar Energy Research center (CERC-Chile) por Fundación Chile y Abengoa Solar Chile S.A. Santiago, Chile: 2013. 1 • CORFO. Resolución N°26: Aprueba bases y sus anexos del 'concurso planta térmica de concentración solar de potencia'. Santiago, Chile, 2012. 24
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SUB CATEGORY: LEADERSHIP

	Score	CONCENTRATION PLANT CERRO DOMINADOR
LD1.1 Provide Effective Leadership And Commitment	**17**	**Conserving**
		Sustainability has been identified as a core value for Abengoa, as well as for the project, being the company's commitment to promote sustainable practices recognized across their projects in the region. Written commitments to the policies implemented by Abengoa can be found on the website, emphasizing the importance of sustainability. Besides, in the project's documentation the environmental responsibilities have been carefully assigned to the different members of the project team, accompanied by the periodicity of the actions, and the definition of the control mechanisms for the sustainability management systems.
		Source: *• Abengoa Chile / Abeinsa EPC. "Capitulo 6: Responsabilidades". Procedimiento Ejecutivo: Manejo de Residuos. By Francisco Valverde H. Chile: July, 2014. 6* *• Abengoa SA. "Nuestro Compromiso". Accessed en March 2015, http://www.abengoa.es/web/es/compania/nuestro_compromiso/*
		RECOMMENDATIONS
LD1.2 Establish A Sustainability Management System	**14**	**Restorative**
		The sustainable goals for the project have been identified as well as the impact these goals will have on the community. Several sustainable target goals are considered including plans to create a sustainable region by promoting efficient management of domestic and industrial waste and enforce environmental liabilities arising from economic activity related with the project, implementing specialized regulations and supporting employment development. The sustainable management system have been defined and the roles of the different members that collaborate on the project have been clearly identified on the Environmental Management Plan as well as the periodicity of the actions that should take place. Control mechanisms for the sustainability management systems are robust and estimated to be sufficient enough to demonstrate changing conditions
		Source: *• Sustentable SA. "Capitulo 6: Descripción de relación entre proyectos y políticas, planes y programas de desarrollo regional y comunal." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 81* *• Abeinsa EPC & Abengoa Chile. Plan De Manejo Ambiental: Proyecto Planta Solar Cerro Dominador. By Francisco Valverde. Santiago, Chile: July, 2014.*
		RECOMMENDATIONS

LD1.3 Foster Collaboration And Teamwork	**15**	**Conserving**
		The concessionaire Abengoa Solar Chile is 100% owned by Abengoa group, therefore all the parties involved in the process belong to the same company. This has allowed a comprehensive planning in different stages of the project design including construction, maintenance, operation and dismantling. A systematic approach towards sustainability is emphasized in all of the phases. The early collaboration phase, incorporated into the process from the beginning, facilitates a more fluid communication while meeting common objectives. Several documented footage from the periodical meetings were provided as an evidence of this collaborative approach.
		Source: *• Abeinsa EPC & Abengoa Solar. Asunto: Comité de Seguimiento. Acta de reunión Nº 0001 (Ref: 0186-ACT-AEPC-AS-0001). Sevilla: España. 24th April, 2014* *• Abeinsa EPC & Abengoa Solar. Asunto: Comité de Seguimiento. Acta de reunión Nº 0013 (Ref: 0186-ACT-UTE-AS-000-000-0013). Sevilla: España. 28th August, 2014* *• 2da Notaria Antofagasta Chile. Contrato de Concesión Onerosa de Terreno Fiscal entre Fisco Chile - Ministerio de Bienes Nacionales - y Abengoa Solar Chile S.A. Antofagasta, Chile: 7th of April, 2014*
		RECOMMENDATIONS The risk/ reward sharing included on the delivery method is an essential piece to guarantee advanced sustainable performance.
LD1.4 Provide For Stakeholder Involvement	**5**	**Enhanced**
		The Corporate Social Responsibility report clearly specifies the need to involve stakeholders into the project strategy as well as incorporating the communication channels followed by the different parties (employees, shareholders, suppliers, clients, local communities and society). A very detailed analysis of the Maria Elena community has been conducted. This will help the project team to identify the current needs in the area and create a more effective engagement process. The participation of several stakeholders and authorities was taken into consideration. This community relationship building has been shown in different public events such as the participation of María Elena´s mayor inaugurating the beginning of the construction as well as the Chilean national and local authorities visiting Abegoa´s headquarters in Spain. Round tables were set up in order to encourage dialogue within regional authorities and to promote innovative territorial participation.
		Source: *• Sustentable SA. "Capitulo 8: Negociaciones con interesados." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 84* *• Abengoa SA. "02: Responsabilidad Social Corporativa". Informe Anual 2013 Abengoa S.A. Accessed in March 2015. 8. http://www.abengoa.es/export/sites/abengoa_corp/resources/pdf/gobierno_corporativo/informes_anuales/2013/Tomo2/2013_Tomo2_IA.pdf.* *• Abengoa SA. Registro de actividades. Chile: July, 2014*
		RECOMMENDATIONS The projects team should clearly establish protocols to integrate the feedback gathered from the stakeholders into the project so all the parties feel identificate with the project development.

LD2.1 Pursue By-Product Synergy Opportunities	**0**	**No score** No information has been gathered based on the pursue of by-products synergy opportunities in the area. *Source:* *N/A* *RECOMMENDATIONS* The identification of unwanted material located in nearby facilities is an opportunity to improve project performance at the same time that the project cut costs and reduces the use of raw materials. This will also create long lasting linkages with the facilities approached on the area.
LD2.2 Improve Infrastructure Integration	**7**	**Superior** Several infrastructure elements were taken into account when designing the facility "Cerro Dominador". The access to the project is through public roads, mainly Route 5 , Route 25 and the road that extends 20.9 kilometers. Also aligned with the principle of infrastructure integration and improvement in efficiency, the project is planning to use an existing transmission line. This transmission line (Encuentro-Sierra Gorda) is owned by Transmisora Mejillones. In the case in which connection to this TL is unavailable, a second transmission line going from Crucero substation to Laberinto substation will be assessable. The use of this transmission line to connect the facility to the grid has created the perfect linkage between new and existing infrastructure. To characterize any other type of elements external to the project apart from the physical infrastructure, a very detailed field work has been conducted. This assessment takes into consideration the landscape, vegetation, wildlife and archeology. No relevant additional infrastructure has been found, however it has been noted by the project team that some community assets such as currently unpaved paths will be upgraded to enhance transportation in the area. *Source:* • *Sustentable SA. "Capitulo 1: Antecedentes Generales." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 9-10* *RECOMMENDATIONS* More specific evidence about the restoration of the community infrastructure assets should be provided as well as the extent of the intervention that will take place on the area.
LD3.1 Plan For Long-Term Monitoring & Maintenance	**0**	**No score** The project is comprised of the construction, operation and maintenance of the solar plant. Due to the early phase of the project, most of the documentation regarding long-term monitoring and maintenance has not been recorded yet. As a result, there is not enough information at this time. *Source:* *N/A* *RECOMMENDATIONS* One of the main purposes of long-term monitoring and maintenance is the optimization on the usage of the piece of infrastructure being built. An appropriate plan will allow ensuring the right performance of the project during the lifecycle of it.

LD3.2 Address Conflicting Regulations & Policies	**1**	**Improved**
		Following the Corporate Social Responsibility report, a very detailed analysis of the applicable regulation in the area was conducted. The purpose of regulation verification was to detect any potential conflicts with existing regulations and reduce potential risks for the project. This analysis demonstrated that there are no evidences that some of current standards used on the area may unintentionally run counter to sustainability goals of the project.
		Source: *• PE y C. "Plan de desarrollo estratégico María Elena 2030". D.5. Formato de Diagnóstico de Sede/País. Focus Abengoa. Santiago, Chile. 17* *• Abengoa SA. "Capitulo 9: Buen Gobierno". Informe Anual 2013 Abengoa S.A. Accessed in March 2015. 143 - 145 http://www.abengoa.es/export/sites/abengoa_corp/resources/pdf/gobierno_corporativo/informes_anuales/2013/Tomo2/2013_Tomo2_IA.pdf.* *• Abeinsa Epc / Abengoa Chile. Listado Referencial de Requisitos Legales. 27th August, 2014*
		RECOMMENDATIONS The work developed among the project team and public officials can help to identify laws, regulations and standards that became obsolete or represent a barrier for the implementation of sustainable practices. The resolution of these conflicts once they have been identified, can be beneficial for the project as well as for future.
LD3.3 Extend Useful Life	**3**	**Enhanced**
		The useful life of the project has been considered to last 30 years, potentially lasting to 50 years. Once the useful life of the project expires, there is a plan to conduct an economic and technical assessment. This will determine the feasibility of material renewability, so that the lifetime of the project can be extended by twenty more years. If it is determined that the facility upgrade is not possible, the project will proceed to dismantle the plant and all the associated facilities. No evidence of flexible features incorporated into the design to extend useful life have been provided.
		Source: *• Sustentable SA. "Capitulo 1: Antecedentes Generales." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 10*
		RECOMMENDATIONS In the case that useful life extension is not possible, predetermination of how each piece of equipment will be disposed / recycled / down-cycled should be undertaken to minimize waste and cost.
LD0.0 Innovate Or Exceed Credit Requirements		*N/A*

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CATEGORY II: CLIMATE AND ENVIRONMENT		
RESOURCE ALLOCATION		
	Score	**CONCENTRATION PLANT CERRO DOMINADOR**
RA1.1 Reduce Net Embodied Energy	**0**	**No score** Due to the early phase of the project no net embodied energy or life cycle energy assessment has been provided. The reported results should account for the sum of energy that was used in the production of the material or product in all different phases of the project. The documentation would include information of raw material extraction, transportation, manufacture, and all-inclusive processes leading to the ready use state of all materials. At this point information according to the construction phase is being recorded as the construction proceeds. *Source:* *N/A* *RECOMMENDATIONS* To create embodied energies assessed the project should integrate an estimation of materials used in significant quantities in all phases of the project life determined by life cycle assessment. The assessment should involve the calculation of the initial embodied energy from their extraction, refinement and manufacture.
RA1.2 Support Sustainable Procurement Practices	**9**	**Conserving** Abengoa is formulating a strong program for sustainable procurement with special focus on Greenhouse gas (GHG) calculation. The implementation of this sustainable practice will be required for all major suppliers working on the project. They will implement an initiative to account and report the greenhouse gas emission to Abengoa. In the case where the hired subcontractor does not follow with any system to calculate the emissions of the processes, Abengoa will provide a 6 months margin to implement this methodology. If after this period the subcontractor has not updated their process, the contractual agreement between Abengoa and the subcontractor can be expired. There are several files that need to be filled out for the project team in order to evaluate the subcontractor. First, the “Previous Supplier Evaluation” followed by the “Continuous Suppliers Assessment” during the construction phase. By signing the Annex 1: Adherence to the Code of Social Responsibility, the subcontractors agree not just on the greenhouse gases calculation but also comply to Abengoa´s social and ethical code.

		Source: *• Abengoa Chile. Procedimiento Ejecutivo: Determinación de las Emisiones de GEI de los Bienes y Servicios Suministrados a Abengoa Chile (Emisiones de Alcance 3). By Karen Garrido. Chile: 19th February, 2013.* *• Abengoa Chile. Ficha de Evaluación Continua de proveedores.* *• Abengoa Chile. Anexo 1: Adhesión a Código de Responsabilidad Social. Proveedor: SK Rental S.A. Chile: 11th of December, 2013* *• Abengoa Chile. Anexo 1: Adhesión a Código de Responsabilidad Social. Proveedor: Ripios de Sierra Gorda S.A. Chile: 5th of August, 2014*
		RECOMMENDATIONS The implementation of the reduction in GHG is an innovative initiative positively considered while assessed the support of Sustainable Procurement Practices, on the other side is recommended to highlight the importance of prescribing materials and equipment's from manufacturers and suppliers who implement sustainable practices. This will have an impact not just on the GHG reduction, but also on the integration of more sustainable practices.
RA1.3 Used Recycled Materials	**2**	**Improved** Different opportunities for waste reduction have been identified on the waste management plan. Household waste should be managed in a controlled manner. Several 200 liter deposits have been installed in different areas as well as waste stations and paper cardboard and plastic bottles will be separated in special containers. However, the main focus of the credit is not based on the recycling strategies but rather on the amount of recycled content that have been used, or will be used in the construction of the project. Using materials with recycled content will reduce the use of virgin materials, which will minimize the amount of waste ending up at the landfill. It is possible that some form of recycled material will be incorporated into the steel that is used on the construction as well as in the fabrication of the heliostats, but due to the early phase of the project, no information has been provided according to this matter. Based on the sustainable management system used by Abengoa, it has been identify the percentage of recycled content of the materials used so far during the construction phase, As it was shown the recycled content on the steel used is high reaching above 90% in all the information provided. On the other side it will be useful to identify what is the percentage that this material represent in terms of weight or volume overall materials used on the project.
		Source: *• Abengoa Chile / Abeinsa EPC. Procedimiento Ejecutivo: Manejo de Residuos. By Francisco Valverde H. Chile: July, 2014.* *• Abengoa S.A. Imágenes Aplicación Sostenibilidad. 18th of October 2010.*
		RECOMMENDATIONS *Creation of an inventory of materials or structure that have recycled content will be important to achieve a higher score in this credit. It is recommended to provide the information in percentage of weight or volume of the materials used.*
RA1.4 Use	**6**	**Enhanced**

Regional Materials		Most of the regional materials used on site are concrete and steel. The project takes into consideration all materials used in excavations, foundations, and structures (concrete, steel or masonry). The concrete will be prepared in situ concrete in the plant installed in the project. The estimated amount of steel is 4,400,000 kg and 53,300 m3 of concrete. Some other materials such as aggregates, industrial salts, industrial water, equipment rental, fuel will also be supplied locally. Due to the early phase of the project, the purchase agreement of some of the construction materials has not been available for further evaluation. However, as identified on the Quality Plan, local suppliers and materials will be considered in order to reduce costs in transport and promote regional development. Abengoa will control the amount of material locally sourced through its internal software and the final estimation predicts that at least 60% of the total material will be locally sourced
		Source: • *Sustentable SA. "Capitulo 2: Descripción del proyecto." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 21* • *Servicio de Evaluación Ambiental, Gobierno de Chile. Resolución Certificación Ambiental N°0231. Antofagasta, Chile: April, 2014. 6* • *Servicio de Evaluación Ambiental, Gobierno de Chile. Resolución Certificación Ambiental N°0231. Antofagasta, Chile: April, 2014. 9* • *Abeinsa EPC / Abengoa Chile. Plan de la Calidad. Prepared by Quality Systems Manager. Chile: 25th of July, 2014. 39*
		RECOMMENDATIONS
RA1.5 Divert Waste From Landfills	**6**	**Enhanced** A very detailed waste management has been conducted in several project documents and its addenda. Waste management informs not just the construction phase but its monitoring throughout the life cycle of the residue (from generation to disposal). Various strategies are implemented in an effort to minimize the amounts of waste generated: perform segregation at source, optimize the use of resources through reuse or recycling, and ensure minimal environmental impact through final disposal at approved sites. This waste management identifies the amount of hazardous and non-hazardous waste as well as the final disposal of every different typology. Domestic waste composed of concrete and rubble fragments will be disposed in existing containers distributed across different parts of the site to be removed every 2 or 3 days to an authorized disposal site. Other materials such as wood, glass, plastic, cardboard, paper, scrap metal, pipes and cables will be collected and sent to a temporary storage area for subsequent recycling. The mirrors from the heliostats are recyclable and when it is time for their replacement, it has been calculated to be around 50 ton/year. The effluent of the treatment plant derived from water used during construction or operation will be reused for wetting road activities, optimizing the use of water as much as possible. Graphic information submitted by the project team identifies that the excavated material is disposed within the perimeter if the site for its later usage. It has been estimated that these initiatives will reduce the waste disposal to at least 50%.

		Source: *• Sustentable SA. "Capitulo 2: Descripción del proyecto." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 25* *• Abengoa Chile. Plan de Contingencia para el Transporte de Sustancias. Chile. 4* *• Sustentable S.A. "Anexo 3. Cuadro consolidado residuos sólidos y efluentes líquidos". Adenda N°1 Declaración De Impacto Ambiental Proyecto Planta Solar Cerro Dominador. Abengoa Solar Chile. February, 2014* *• Sustentable S.A. "Anexo 3. Cuadro consolidado residuos". Adenda N°2 Declaración De Impacto Ambiental Proyecto Planta Solar Cerro Dominador. Abengoa Solar Chile. March, 2014*
		RECOMMENDATIONS *Identification of the exact percentage of materials reused or recycled by volume or weight according to the total volume of waste produced.*
RA1.6 Reduce Excavated Materials Taken Off Site	**5**	**Superior**
		The prepared site for the project will require a flat and uniform location. The original lot was considered to be very flat but some cuts and fills were deemed necessary. The excavation will take place mainly for the foundation of the different structural elements that compound the project and the underground part of the transmission line. It is estimated that most of the volume of excavated material will be used onsite for different processes. There is no information in the documentation provided that the soil has been taken off site. In terms of excavated material reuse, it has been identified that the material from the deepest quaternary deposits (sands with gravel) and volcanic rocks are considered valid for filling, something to consider will be the 95% of compaction that is required.
		Source: *• Sustentable SA. "Capitulo 2: Descripción del proyecto." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 20* *• Abengoa Chile / Abeinsa EPC. Procedimiento Ejecutivo: Manejo de Residuos. By Francisco Valverde H. Chile: July, 2014. 8* *• Abengoa Solar. Informe Técnico: Análisis y Resumen Estudio Geotécnico CSP Atacama 1. By J. Ibarra. August, 2014. 4*
		RECOMMENDATIONS *Identification of the areas where the cut and fill will take place will be required, also design documents demonstrating that this practice was integrated into the project as a design strategy.*

RA1.7 Provide for Deconstruction & Recycling	**1**	**Improved** The lifespan of the project will be 30 years and after this period, a technical and economical feasibility study will be conducted. The study will determine whether the upgrade of certain materials and technologies can keep the project running for a longer period. Once the dismantling phase starts, several activities will take place; decommissioning of the solar tower, solar cells and different equipment, facilities and electrical infrastructure; demolition of buildings and other typology of constructions; elimination of foundations; elimination of interconnections and desurbanización. It has been stated that during the closure phase, equipment or materials will be reused or recycled when applicable. The ones unable to be recycled will be sent to a landfill. Due to the modular nature of the project, it is likely that the percentage of reuse material will be high after the dismantling of the facility, but there is no specific information regarding the amount that will be reused. *Source:* *• Servicio de Evaluación Ambiental, Gobierno de Chile. Resolución Certificación Ambiental N°0231. Antofagasta, Chile: Abril, 2014. 11* *RECOMMENDATIONS* *Detailed identification (in percentage of weight r volume) of the project strategy for deconstruction and disassembly of the different materials identifying the future usage of these elements. Often times a good deconstruction or disassembly strategy should be identified from the design.*
RA2.1 Reduce Energy Consumption	**3**	**Improved** One of the characteristics of the facility is the high efficiency. Through several tanks of high temperature salt storage, it is possible to produce electricity for up to 24 hours. The high temperature is used in a steam generator that operates a moving turbine to produce electricity. Aside from an increase in efficiency, no specific measures have been identified to reduce energy consumption within the project boundaries. *Source:* *• Sustentable SA. "Capitulo 2: Descripción del proyecto." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 15-16* *RECOMMENDATIONS* *An inventory with different strategies to save electricity in the different processes will be useful to achieve higher levels of energy reduction.* *The reduction in energy consumption can apply to many different scale, from the facility itself, to the buildings in all their different usages*
RA2.2 Use Renewable Energy	**20**	**Restorative** This is a non-conventional energy project that will generate net positive energy through the use of the sun. The project is divided in two different facilities, the solar tower and the photovoltaic plant. Each of them will supply a capacity of 110 MW of renewable energy. Certain processes such as salt melting in the ad-hoc boiler will require the use of natural gas during the operation. The power necessary to operate the boiler and tank filling will most likely feed from diesel generators. The extent of renewable energy produced onsite v. utilization of fossil fuels is considered to be net positive.

		Source: *• Sustentable SA. "Capitulo 2: Descripción del proyecto." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 29* *• Servicio de Evaluación Ambiental, Gobierno de Chile. Resolución Certificación Ambiental N°0231. Antofagasta, Chile: April, 2014. 9*
		RECOMMENDATIONS *It is recommended to establish a system able to supply renewable energy generated onsite to cover the energy needs of the operation phase.*
RA 2.3 Commission & Monitor Energy Systems	**3**	**Enhanced** After the installation and commissioning, several test will be conducted before the operation of the project. These tests are performed by employees assigned to Group Testing's and will be supervised by the Technical Project Manager. The result gathered from these tests will inform a Provisional Acceptance report. Once this report is accepted by the Abengoa Solar, the document Provisional Acceptance Certificate will be issued. An assessment was conducted by a third party identifying the anticipated energy production that the facility will generate once operations begin. Due to the early phase of the project, a long-term monitoring plan showing specification, equipment, and details on efficiency in operation has not yet been developed. Nevertheless, it is expected that a detailed plan with a third commission party will measure and document the efficiency of the electrical and mechanical systems implemented on the facility, guaranteeing the best performance.
		Source: *• Abeinsa EPC / Abengoa Chile. Plan de Calidad. Prepared by Quality Systems Manager and approved by Emiliano Badía De Ferrari, Project Director. July, 2014. 36*
		RECOMMENDATIONS *To conduct a long term monitoring plan to measure the efficiency on the operation of the facility during its entire life expectancy.*
RA3.1	**17**	**Conserving**

Protect Fresh Water Availability		This credit assesses the extraction of freshwater without replenishing the source, generating a steady decrease on the water availability. Considering the location of the project, which is a deserted area, no freshwater, is available or expected to be used either in construction or operation phase. Industrial water is used in specific tasks designated for use of cleaning, concrete making amongst others. The amount of water estimated to be used is 127.750 m3/year. During the construction phase, one of the main areas of grey water production comes from the one generated for the employees, specially taking into account that around 700 people will live in the facility during the construction phase. A water treatment plant will be installed within the site and this facility will treat 70% of the total wastewater produced while the rest will be handled in chemical baths. The treated water will be stored and reused for wetting the roads. During the operation period, sewage and industrial wastewater will be handled accordingly. The first water waste will be treated and reused for watering the paths. This amount is estimated in 10.5 m3 / day. The water coming from industrial activity corresponds to concentrated effluents (0.95 1 / s) from the osmosis plant (concentrated salt) and the cooling tower. This water will be sent to evaporation ponds from which the dry sludge will be disposed at authorized sites. During the facility's closing phase, the only wastewater produced will be from the sewage, generated by 50 workers employed at this stage. The volume of this water has been estimated to be around 7.5 m3 / month and will also be treated in the plant and reused.
		Source: • *Servicio de Evaluación Ambiental, Gobierno de Chile. Resolución Certificación Ambiental N°0231. Antofagasta, Chile: Aprill, 2014. 8, 13, 14* • *PE y C. "1.5 Hidrografía". D.5. Formato de Diagnóstico de Sede/País. Focus Abengoa. Santiago, Chile. 6* • *KV Consultores. Extracto estudio geotécnico del proyecto. N/D. 4*
		RECOMMENDATIONS
RA3.2 Reduce Potable Water Consumption	**17**	**Conserving** The construction or operation process in the facility does not use potable water. The potable water consumption within the facility will be exclusively for human consumption with the exception of filter washing during the operation phase. The total amount of potable water used is 38.325 m3 / year during construction, 14.000 m3 / year for operation, and 625 m3 / year for closing of the facility. To ensure the maintenance of water quality, a water treatment plant for potable water production will be installed in the project facilities, therefore all the potable water will be treated onsite. A water filter will remove the impurities affecting the odor or taste of the water and chlorine will be added to the water to prevent the development of bacteria and germs. The filtered drinking water will be stored in tanks for its use. There will be a recirculation line that returns the water from the tank to the inlet of the water treatment plant to maintain the required quality level for human consumption. After its usage, the water will be recycled into the water treatment plant installed onsite as well. For the rest of the operation of the facility, greywater or recycled water will be used. The biggest water demand will be for cleaning, concrete making and watering roads to prevent dust near the area of the project, simultaneously guaranteeing high efficiency of the heliostat once the facility is in operation.

		Source: *• Sustentable SA. "Capitulo 1: Antecedentes Generales." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 9* *• Sustentable SA. "Capitulo 2: Descripción del proyecto." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 25* *• Servicio de Evaluación Ambiental, Gobierno de Chile. Resolución Certificación Ambiental N°0231. Antofagasta, Chile: April, 2014. 8*
		RECOMMENDATIONS
RA3.3 Monitor Water Systems	**3**	**Enhanced**
		Based on the monitoring of water during the operations and the impact of the operation on received waters, it is important to point out that there will be no discharges into the water bodies. Even though no water discharges have been planned, a control program for monitoring spills of dangerous substances into streams has been conducted. The only identified risk of water pollution is when trucks, loaded with dangerous substances, cross over water bodies. To assist trucks drivers to precisely locate the water streams on their way, a hydrological network routes map from the Military Geographic Institute will be provided. A very detailed protocol has been designed in case of leakage of hazardous substances. Due to the early phase of the project, long- term monitoring program under regular conditions (no emergency) has not been developed at this point.
		Source: *• Sustentable S.A. "Anexo 5. Programa De Control, Monitoreo Y Seguimiento De Derrame De - Sustancias Peligrosas A Curso De Agua". Adenda N°2 Declaración De Impacto Ambiental Proyecto Planta Solar Cerro Dominador. Abengoa Solar Chile. March, 2014* *• Sustentable SA. "Requerimientos de Agua y su Tratamiento." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 28*
		RECOMMENDATIONS *Monitoring water systems will be the first step to detect any kind of event of spill, into the water or the soil surrounding the water body. Even though there is not expected to be a direct impact of the project into the water systems, a long-term monitoring will help to detect early enough any possible alteration of the original conditions.*
RA 0.0 Innovate Or Exceed Credit Requirements		*N/A*
	92	

NATURAL WORLD		
	Score	**CONCENTRATION PLANT CERRO DOMINADOR**
NW1.1 Preserve Prime Habitat	**9**	**Superior**
		The area where the project is located has been specified as a desert. The soil is considered to have low ecological value for forestry and farming purposes. Desert soils have high concentrations of silt and very fine sand alluvial and soil is underdeveloped, mainly due to extreme weather conditions with little to almost non participation of water. Thus, no areas with high ecological value have been found. The geographical landscape where Cerro Dominador is located is mainly flat and 1,482 meters above sea level (masl), surrounded by areas with higher elevation of 1,554 masl.
		Source: *• PE y C. D.5. Formato de Diagnóstico de Sede/País. Focus Abengoa. Santiago, Chile. 5*
		RECOMMENDATIONS
NW1.2 Preserve Wetlands and Surface Water	**2**	**Improved**
		Due to the deserted location of the project, water resources are scarce. The closest hydrological feature with permanent flow of water is the Loa River. This river is located north of the project area and was identified as non impacted by the project. A study conducted onsite determined the absence of any water table. The existence of water on the area is mainly seasonal.
		Source: *• Sustentable SA. "Capitulo 3: Otros antecedentes para evaluar que el proyecto o actividad no requiere presentar un estudio de impacto ambiental." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 41*
		RECOMMENDATIONS *Considering that surface waters and wetlands are not affected for the project, there are no recommendations at this point*
NW1.3 Preserve Prime Farmland	**12**	**Conserving**
		As previously specified, the project is located on desert land with minimal precipitation and poor soil quality. The area has been evaluated as inhospitable for any kind of farming purposes. The desert soil composition consists high concentrations of salt and sand and the weather conditions are extreme in terms of heat and cold. Land considered for farming is not being developed for the construction of the project.
		Source: *• Sustentable SA. "Capitulo 5: Permisos Ambientales Sectoriales." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 76*
		RECOMMENDATIONS *Since no prime farmland is being developed by the construction of the project, no recommendations are provided at this point.*

NW1.4 Avoid Adverse Geology	**5**	**Conserving** This credit measures the avoidance of adverse geology that could represent risk for the project as well as for groundwater formations or aquifers. A geotechnical study was conducted on the project site near drilling and mechanical pits in the most relevant areas where the project will be located, especially where the main structures of the project will be positioned. To guarantee total avoidance of areas with adverse geology and therefore eliminate possible risks, a very detailed geotechnical study has been conducted. The result of the aforementioned study consists on 23 drills, which equals 558 linear meters of drilling. From the 23 drills 18 of them were done on the base of the solar tower and 5 on the solar field. A total of 49 mechanical pits were held in the other sectors of the solar field, which allowed defining a preliminary stratigraphy section of the land where the project is located. This allowed the opportunity to locate the project in a safe area with no adverse geology associated. *Source:* *• Abengoa Solar. Informe Técnico: Análisis y Resumen Estudio Geotécnico CSP Atacama 1. By J. Ibarra. August, 2014. 1, 2* *• KV Consultores. Extracto estudio geotécnico del proyecto. N/D.* *RECOMMENDATIONS* *Considering that the project has achieved total adverse geology avoidance, there are not recommendations at this point*
NW1.5 Preserve Floodplain Functions	**5**	**Enhanced** The landscaping surrounding the project is considered very superficial with seasonal development of mudflows and presence of rocky outcrops. The location of the project is are not areas described as a floodplain. In order to not affect the infiltration of soil, a drainage system has been designed around the facility. The channels created are excavations on the ground without any treatment, which will allow free drainage of rainwater. These channels run parallel service roads with the same slope and lead the water to discharge to specific points. In order to maintain the water management capacities and not impacting the infiltration onsite, the water is directed outwards of the project area in a way that can continue to flow normally. Some other channels are planned to avoid the entrance of water from outside the project lot. Based on the flora and fauna report, there are no riparian or aquatic habitats to be preserved . *Source:* *• KV Consultores. Extracto estudio geotécnico del proyecto. S/F. 4* *• Sustentable S.A. Adenda N°1 Declaración De Impacto Ambiental Proyecto "Planta Solar Cerro Dominador". Abengoa Solar Chile. February, 2014. 14* *RECOMMENDATIONS* *The project has integrated the measures to preserve floodplain functions required according with the context of the project that they are working, desert area, where no floodplains have been identified.*

NW1.6 Avoid Unsuitable Development on Steep Slopes	**6**	**Conserving**
		The geomorphology has been described as flat with altitudes between 1,600 and 1,700 meters. Sierra Gorda is the highest topographic hill with 1,766 m.s.n.m. It has been described on the project that the slopes must have an inclination of 3H: 2V to maximum height of 3 meters. Nevertheless, the land where the project is located has been described as flat and vegetation free, therefore the project is considered to be located on a save area without affection of landslides or natural hazards.
		Source: *• Sustentable SA. "Capitulo 5: Permisos Ambientales Sectoriales." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 68* *• Abengoa Solar. Informe Técnico: Análisis y Resumen Estudio Geotécnico CSP Atacama 1. By J. Ibarra. August, 2014. 5* *• KV Consultores. Extracto estudio geotécnico del proyecto. S/F. 4*
		RECOMMENDATIONS
NW1.7 Preserve Greenfields	**10**	**Superior**
		Greenfields are described as undeveloped land with natural landscape, natural amenities or agricultural land. The landscape in this area is dominated by natural use, but it is noteworthy to mention that this is in an area with strong industrial, mining development, saltpeter extraction as well as the existence of transmission lines. This transmission lines are structures that disrupt the landscape and lower its quality.
		Source: *• Sustentable S.A. "3.3 Unidades De Paisaje". Informe de Paisaje Proyecto Planta Solar Cerro Dominador. By Juan José Sáez. Santiago, February 2012. 9*
		RECOMMENDATIONS *Detailed evaluation of the percentage of developed area, and the precise identification as a greyfield. Even thought the documentation provided identify the plt as previously developed, there are not specific regulations applied, which officially designate the land as a greyfield.*
NW2.1 Manage Stormwater	**9**	**Superior**
		Considering that the land was previously developed, this project takes into account the fact of being located within greyfield. Therefore, just 60% if the water is required to be captured by a custom system that regulates the conveyance of stormwater, which can potentially damage the project's facilities. The water from the power island (area where the main facilities are located) is captured and conducted underground outside of the perimeter of the field. The rainwater from the solar field is captured and conducted by channels outside of the project area. The drainage channels are directly excavated on the ground allows which allows free drainage of rainwater. Due to the characteristics of the land, it is not required to incorporate additional materials directly on the ground without any treatment. The water will be taken out of the project area allowing the current to continue its flow. This rainwater system minimizes possible impacts on the facility through water capture and distribution.

		Source: *• Servicio de Evaluación Ambiental, Gobierno de Chile. Resolución Certificación Ambiental N°0231. Antofagasta, Chile: April, 2014. 7* *• KV Consultores. Extracto estudio geotécnico del proyecto. N/D. 4* *• Sustentable SA. Adenda N°1 Declaración De Impacto Ambiental Proyecto Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: February, 2014. 14* *• Sustentable S.A. Informe Biótico Proyecto Planta Solar Abengoa. By Juan José Sáez and Constanza Méndez. Santiago, February 2013. Plano de localización.* *• Abeinsa / Abengoa Solar. Dibujo #:0043-PLN-ATP-00-56-001. Sistema de captación y conducción de aguas de lluvia. January, 2014.*
		RECOMMENDATIONS
NW2.2 Reduce Pesticides and Fertilizer Impacts	**0**	**No score**
		Pesticides and fertilizers are identified as a source of soil and water pollution, therefore whenever possible, the use of these sources should be reduced or eliminated. According to the information provided, the area of study is described as desert. There is no vegetation required to be treated or close watercourses susceptible to pollution. No efforts have been required to reduce the usage of pesticide within the facility.
		Source: *• Sustentable S.A. Informe Biótico Proyecto Planta Solar Abengoa. Byr Juan José Sáez and Constanza Méndez. Santiago, Febrero 2013. 7.*
		RECOMMENDATIONS
NW2.3 Prevent Surface and Groundwater Contamination	**9**	**Superior**
		According to groundwater contamination, a very detail assessment identifying the type of hazardous substances used has been conducted. The operation of the solar plant as well as the potabilization of the water used onsite will require some chemical usage. The main ones are Biocide (12.5% sodium hypochlorite) Coagulant (PAC to 18%), hydrochloric acid (25%), sodium bisulfite (35-40%), sodium hydroxide (49%), sulfuric acid (96-98%) and sodium hydroxide (25%). The quantities to be storaged are around 10 tons, and they follow the current regulations DS 78/2009 established by Ministry of Health. Specific procedures have implemented to avoid potential water contamination to water bodies when being crossed by trucks. Other protocols such as the decanting process of the wastewater coming from the concrete plant were implemented from early stages. An example of this is the decanting process used for the wastewater coming from the concrete plant. Part of this residue is reused on the concrete plant and part of it is sent to a drying pool where the solid residue is separated and properly disposed. All the water used for wetting the paths will be industrial water that is not appropriate for human consumption. This water will be treated beforehand to avoid groundwater contamination. Most of the described initiatives related to this credit refer to designing for prevention of accidents that could create surface and groundwater contamination.

		Source: *• Sustentable SA. "Capitulo 2: Descripción del Proyecto." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 29* *• PE y C. D.5. Formato de Diagnóstico de Sede/País. Focus Abengoa. Santiago, Chile. 6* *• Sustentable SA. Permisos Ambientales Sectoriales. Adenda N°1 Declaración De Impacto Ambiental Proyecto Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: February, 2014. 20* *• Abengoa Solar. Informe Técnico: Análisis y Resumen Estudio Geotécnico CSP Atacama 1. By J. Ibarra. August, 2014. 4*
		RECOMMENDATIONS *The next step from the sustainability perspective will be to achieve the design focus from the source elimination perspective. This will allow, not just to prevent accidents to happen but to reduce the real risk associated with that risk. Besides, provisions for monitoring the open channel flows of stormwater leaving the site should be considered.*
NW3.1 Preserve Species Biodiversity	**2**	**Improved** A very detailed study has been conducted to identify the flora and fauna in the area. Base on the provided information, the area has been classified as desert, without presence of watercourses, which are considered an important feature for vegetation growth and species development. As a result, the project will not have a negative effect on native flora. According to the inventory of wildlife in the area, no major evidences of fauna have been found. The observed species were divided according to classes. Several birds were seen in the study area as well as one specie of rodent. No reptiles or amphibians have been seen in this area. Even though not a very diverse category of flora and fauna were found, several mitigation measures were described. Some examples are specific environmental training for employees in order to sensitize them in biodiversity aspects, hunting ban, and incident response protocols in case that wildlife is affected.
		Source: *• Sustentable S.A. Informe Biótico Proyecto Planta Solar Abengoa. By Juan José Sáez y Constanza Méndez. Santiago, February 2013. 7 & 14* *• Abeinsa EPC & Abengoa Chile. Plan De Manejo Ambiental: Proyecto Planta Solar Cerro Dominador. By Francisco Valverde. Santiago, Chile: July, 2014. 17* *• Sustentable SA. Adenda N°1 Declaración De Impacto Ambiental Proyecto Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: February, 2014. 14*
		RECOMMENDATIONS *No relevant flora or fauna has been found on the area, as a result no specific measures should be implemented*
NW 3.2 Control Invasive Species	**0**	**No score** Invasive species include non-indigenous or non-native species of flora and fauna that adversely affects the habitat or regions they invade. The region where the project is located has been identified as an interior desert of the Antofagasta region. Starting on the border with Peru, the vegetation is very limited, mainly due to the characteristics of the soil with high content in salt. Due to the lack of vegetation of any type, no invasive species have been identified on the area.

		Source: *• Sustentable SA. "Anexo 4: Informe de Flora y Fauna." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 7 & 14*
		RECOMMENDATIONS *Due to the lack of vegetation, no recommendations are provided at this point*
NW3.3 Restore Disturbed Soils	**8**	**Conserving**
		The restoration of the soil where the project has been located is an important practice towards sustainability. This will help to bring the land close to its natural state previous to the development. Although the land has been described as mainly flat, some earthworks such as surface cleaning, excavations and fillings will need to be conducted. After the completion of the construction, several measures will be applied to guarantee the restoration of the soil. Some of these measures are: removal of elements that do not belong to the site, removal of materials not used, and verification of possible polluted areas identifying the level of pollution.
		Source: *• Servicio de Evaluación Ambiental, Gobierno de Chile. Resolución Certificación Ambiental N°0231. Antofagasta, Chile: Aprill, 2014. 6* *• Abeinsa EPC & Abengoa Chile. Plan De Manejo Ambiental: Proyecto Planta Solar Cerro Dominador. By Francisco Valverde. Santiago, Chile: July, 2014. 21*
		RECOMMENDATIONS
NW3.4 Maintain wetland and surface water functions.	**0**	**No score**
		This credit evaluates the maintenance and restoration of the different ecosystem functions within several water features such as streams, wetlands, water bodies and riparian areas. The assessment of these ecosystems includes the enhancement of hydrologic connections, maintenance and enhancement of water quality and habitat in the area. The conservation of sediment transportation is also taken into consideration. Due to the desert properties of the project location, the preservation of the four previously cited water functions are considered to be not significant to the project. Based on the lack of surface water or wetlands being affected by the project, this credit is considered not applicable for this project.
		Source: *• Sustentable SA. "Anexo 4: Informe de Flora y Fauna." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 7*
		RECOMMENDATIONS
NW 0.0 Innovate Or Exceed Credit Requirements		*N/A*
	77	

CLIMATE AND RISK		
	Score	**CONCENTRATION PLANT CERRO DOMINADOR**
CR1.1 Reduce Greenhouse Gas Emissions	**18**	**Conserving** Based on the project's emphasis on the production of energy through renewable sources as opposed to the traditional way of energy production, Cerro Dominador will greatly reduce Greenhouse gas emissions. The project team will calculate the greenhouse gases emissions (GHGs) generated by the project as a part of the annual GHG inventory of the company. Some small machinery or other types of boilers are powered with natural gas. Accountant of GHG is being done not just at the corporate level worldwide, but for all the subcontractors who are working for Abengoa. These types of practices have been specified far above and beyond the common practices implemented in the country by following the local regulation and good practices. The initiative promoted for Abengoa to implement accountant methodologies not just in this company but also in sub constructors, will count towards innovation credits. *Source:* • *Abengoa Chile. Procedimiento Ejecutivo: Determinación de las Emisiones de GEI de los Bienes y Servicios Suministrados a Abengoa Chile (Emisiones de Alcance 3). By Karen Garrido and Marcela Serrano. February, 2013* • *Abengoa Chile. Ficha de Evaluación Continua de proveedores.* • *Abengoa Chile. Anexo 1: Adhesión a Código de Responsabilidad Social. Proveedor: SK Rental S.A. Chile: 11th of December, 2013* • *Abengoa Chile. Anexo 1: Adhesión a Código de Responsabilidad Social. Proveedor: Ripios de Sierra Gorda S.A. Chile: 5th of August, 2014* *RECOMMENDATIONS* *The following step for reduction of GHG will be to promote a net carbon negative, which will go beyond carbon neutral. To achieve this level a life cycle carbon assessment should be conducted providing evidence that the project is carbon negative and sequesters more carbon equivalent (CO2e)emissions that it produces.*
CR1.2	**12**	**Conserving**

Reduce Air Pollutant Emissions		The project has been assessed as a non-conventional facility for renewable energy production, which will create electricity for up to 24 hours and reduce the amount of air pollutants drastically compared to a conventional method of electricity production. A detailed assessment has been conducted on the amount of air pollutants that will be emitted during the phases of construction, operation and closing of the facility. These pollutants are mainly related to vehicles and other types of machinery and have been identified as PM 10, PM 2.5, NOx, SOx, HC, CH4, N2O and NH·3. Before starting the operation of the facility, the plant must merge the salts that retain heat captured by the tower. This is a 70 days process. During this operation, emissions of nitrogen oxide will be captured by the system and will reduce the NOx emissions with an efficiency of 99.5%. The NOx emission is estimated at 1,100 [kg / day] based on empirical data from existing plants in operation in Spain. During the phase of operation, the plant does not generate pollutants while the boiler works 1 hour a day, reinforcing the inertia of the thermal fluid. The emissions estimated for the boiler are 0.68 ton / a not of MP1 0, 0.32 ton / a not of NOx and 4.16 ton / year of CO. To verify that the emissions were not harmful for the environment, a computational model AERSCREEN has been conducted. This creates a simulation considering multiple simultaneous sources as well as detailed weather information. The result of this report determines that the estimated emissions for the construction phase does not significantly affect the environment.
		Source: *• Sustentable SA. "Capitulo 2: Descripción del Proyecto." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 30* *• Servicio de Evaluación Ambiental, Gobierno de Chile. Resolución Certificación Ambiental N°0231. Antofagasta, Chile: April, 2014. 9* *• DIA Central Termosolar. Informe De Calidad Del Aire. By Ignacio Goic. May, 2013. 3, 10*
		RECOMMENDATIONS
CR2.1 Assess Climate Threat	**0**	**No score**
		Regarding the assessment of climate change in advising the project, some measures are being considered to better inform its implementations. Following the guidelines set by Intergovernmental Panel on Climate Change (IPCC), Abengoa analyzes in detail the risk that climate change could cause for certain typologies of infrastructure. The factors evaluated on climate change are mainly based on projection of temperature rise and changes in precipitation. If the temperature rise at the site of the project is greater than 3 ° C, the risk is considered high, otherwise, the risk is considered low. In matters of rainfall, if the variation of precipitation in the project site is over 10% (+/- 10%), the risk is considered high, otherwise, the risk is considered low. The area is considered to impact high climate change only if both two risks are considered high. This focus on climate change is informed by the projects of biofuel plants, power plants, solar plants, power transmission projects and water pipeline projects. At the project level, monitoring climate risk is held by NOC 03 002 Risk Analysis. Although details of the practices of Abengoa are included in their projects, there is no detailed information regarding what the result of various design variables are and what the expected climatic changes are in the area.
		Source: *• Abengoa, "Análisis de Riesgos asociados al Cambio Climático: la protección de los activos de Abengoa", 2014*

		RECOMMENDATIONS *Specific documentation apply to the project regarding how climate change has been included as one of the criteria to estimate different scenarios.*
CR2.2 Avoid Traps And Vulnerabilities	**2**	**Improved**
		Some of the most relevant vulnerabilities identified from the country's perspective are the growing demand of electricity in the country above their productive capacity and water scarcity. This project has been designed to provide an answer to both issues. From the electricity perspective, this is a non-conventional renewable electricity facility, looking for a high efficiency due to the non-stop 24-hour energy production. From the water perspective, it has been observed that the water scarcity in the area is one of the big challenges the region faces today. As previously identified, a high efficient method of water usage is reducing the water usage for energy production. During the construction phase, one of the main areas of grey water production comes from the one generated strictly for the employees. A water treatment plant will be installed within the site and this facility will treat 70% of the total wastewater produced while the rest will be handled in chemical baths. The treated water will be stored and reused for wetting the roads. During the operation period, sewage and industrial wastewater will be handled accordingly. This intensive water management will create a highly efficient system in terms of water usage and, this practices will reduce the vulnerabilities associated with its scarcity.
		Source: *• Sustentable SA. "Capitulo 1: Antecedentes Generales." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 9* *• Sustentable SA. "Capitulo 2: Descripción del Proyecto." Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013. 25* *• Servicio de Evaluación Ambiental, Gobierno de Chile. Resolución Certificación Ambiental N°0231. Antofagasta, Chile: April, 2014. 8*
		RECOMMENDATIONS *Clear identification of traps and vulnerabilities in the area will help to promote a more sustainable outcome. Specific plans to mitigate these vulnerabilities will be also required.*
CR2.3 Prepare For Long-Term Adaptability	**0**	**No score**
		Due to the long lifespan of the infrastructure projects, it is important to account for long-term climate change as well as project adaptability for long- term scenarios. To provide a score for this credit, a plan designed to identify the proposed alternatives should be taken into consideration during the design phase as well as the changing weather conditions that can create water scarcity, extended drought and heat, heat waves or modification in precipitation. Following project team specifications, a similar assessment was developed during the design phase to identify the most convenient facility design. The information provided makes reference to practices developed at the corporate level, but not specific information about an adaptation plan specific to this project has been provided.
		Source: *• Abengoa. Análisis de Riesgos asociados al Cambio Climático: La protección de los activos de Abengoa. October 2014*

		RECOMMENDATIONS *Very detailed explanation has been provided on how to evaluate a project from the long-term availability perspective, to go a step further, more specific information should be provided specifically on the project being evaluated "Cerro Dominador".*
CR2.4 Prepare For Short-Term Hazards	**3**	**Improved**
		One of the key aspects of the infrastructure project is to increase the resilience and the long-term recovery caused by natural short-term or man-made hazards. Most of the risks identified are short-term man-made hazards and these are mostly related to transportation of substances, spills or leakages. The truck drivers will be trained in safety measures to reduce the risk as much as possible. The measures to be taken change according to the type of product transported, fuels, oils and lubricants, to a wide variety of other products. In case of an accident, very specific protocols will need to be followed. The first group of immediate action is performed by cleaning team with cleaning and signaling materials. If necessary, a second group of action, consisting of machinery necessary to contain the spill will be sent to the site. There are also protocols to communicate the incident and procedures post-incident.. Once the control activities and neutralization procedures have been conducted, a report identifying the environmental impact will be issued. In terms of weather conditions, risks associated to intense rain, storms or wind have been identified
		Source: *• Abeinsa EPC & Abengoa Chile. Plan De Manejo Ambiental: Proyecto Planta Solar Cerro Dominador. By Francisco Valverde. Santiago, Chile: July, 2014. 7, 21* *• Abengoa Chile / Abeinsa EPC. "Capitulo 6: Responsabilidades". Procedimiento Ejecutivo: Manejo de Residuos. By Francisco Valverde H. Chile: July, 2014. 1* *• Abengoa Chile / Abeinsa EPC. Plan de Emergencia: Proyecto - Termo Solar de generacion de energia electrica CSP 110 MW Cerro Dominador. By Carolina Roblero and Francisco Valverde. July, 2014. 16*
		RECOMMENDATIONS *Very detailed explanation has been provided on how to evaluate a project from the long-term availability perspective, to go a step further, more specific information should be provided specifically on the project being evaluated "Cerro Dominador".*
CR2.5 Manage Heat Island Effects	**0**	**No score**
		As specified by the project team, the project does not influence or promote heat island effect. No information has been provided regarding this topic.
		Source: *N/A*
		RECOMMENDATIONS *There is no specific information identifying to what degree, if so the location of the facility can influence or promote the heat island effect.*

CR0.0 Innovate Or Exceed Credit Requirements	**5**	*As previously mentioned, one of the measures that Abengoa applies to all the projects worldwide is the accountant for direct and indirect greenhouse gases (GHGs) to estimate the carbon footprint. This process faces several challenges such as the lack of expertise in this kind of calculations from some of the companies and subcontractors working for a single project. According to the protocols established by Abengoa, the sub constructor will have a 6 months window to implement a GHG accounting methodology into the company therefore they can report periodically to Abengoa. The implementation of the GHG calculation is signed by the subcontractor into the "Agreement Reporting System of Greenhouse Gases Emissions." In case of failure to implement these measurements in the 6 months period specified, Abengoa will have the right to terminate the contract. The emissions reported will include the direct emission consumption of electricity or thermal energy, as well as indirect emissions associated with goods and services purchased by the supplier towards the completion of the project. This will set up the baseline for GHG emission and will allow the reduction simultaneously, introducing an innovative way to think in collaboration with Abengoa.* *<u>Sources:</u>* *• Abengoa Chile. Procedimiento Ejecutivo: Determinación de las Emisiones de GEI de los Bienes y Servicios Suministrados a Abengoa Chile (Emisiones de Alcance 3). By Karen Garrido and Marcela Serrano. February, 2013* *• Abengoa Chile. Ficha de Evaluación Continua de proveedores.* *• Abengoa Chile. Anexo 1: Adhesión a Código de Responsabilidad Social. Proveedor: SK Rental S.A. Chile: 11th of December, 2013* *• Abengoa Chile. Anexo 1: Adhesión a Código de Responsabilidad Social. Proveedor: Ripios de Sierra Gorda S.A. Chile: 5th of August, 2014*
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OVERALL:	**399**	**CONCENTRATION PLANT CERRO DOMINADOR**

APPENDIX E: SOURCES

DOCUMENTATION PROVIDED
General Information
* 2da Notaria Antofagasta Chile. Contrato de Concesión Onerosa de Terreno Fiscal entre Fisco Chile - Ministerio de Bienes Nacionales - y Abengoa Solar Chile S.A. Antofagasta, Chile: April 7th, 2014
* Abeinsa EPC / Abengoa Chile. Especificación para oferta de Campamento de Vida y Oficinas. By Yolanda García Rodríguez. August, 2014.
* Abeinsa Epc / Abengoa Chile. Listado Referencial de Requisitos Legales. August 27th, 2014
* Abeinsa EPC / Abengoa Chile. Matriz de Identificación y Evaluación de Aspectos Ambientales. August 2014.
* Abeinsa EPC / Abengoa Chile. Organización Proyecto Cerro Dominador 110 MST.
* Abeinsa EPC / Abengoa Chile. Plan de Calidad. Prepared by Quality Systems Manager and approved by Emiliano Badía De Ferrari, Project Director. July, 2014.
* Abeinsa EPC & Abengoa Chile. Plan de Manejo Ambiental: Proyecto Planta Solar Cerro Dominador. By Francisco Valverde. Santiago, Chile: July, 2014.
* Abeinsa EPC & Abengoa Solar. Asunto: Comité de Seguimiento. Acta de reunión Nº 0001 (Ref: 0186-ACT-AEPC-AS-0001). Sevilla: España. April 24th, 2014
* Abeinsa EPC & Abengoa Solar. Asunto: Comité de Seguimiento. Acta de reunión Nº 0013 (Ref: 0186-ACT-UTE-AS-000-000-0013). Sevilla: España. August 28th, 2014
* Abeinsa. Análisis de Riesgos / NST Corfo 110 MW. Cliente: Abengoa Solar. September, 2013.
* Abengoa Chile / Abeinsa EPC. Plan de emergencia y Anexos 'Proyecto Termo Solar de generación de energía eléctrica CSP 110 MW Cerro Dominador'. By Carolina Roblero y Francisco Valverde. Chile: July, 2014
* Abengoa Chile / Abeinsa EPC. Procedimiento Ejecutivo: Manejo de Residuos. By Francisco Valverde H. Chile: July, 2014.
* Abengoa Chile. Accesibilidad, seguridad y señalización Proyecto: CSP Atacama 1.
* Abengoa Chile. Anexo 1: Adhesión a Código de Responsabilidad Social. Proveedor: SK Rental S.A. Chile: December 11th, 2013
* Abengoa Chile. Anexo 1: Adhesión a Código de Responsabilidad Social. Proveedor: Ripios de Sierra Gorda S.A. Chile: August 5th, 2014
* Abengoa Chile. Departamento de Prevención de Riesgos. Estaciones de emergencia. January, 2013.
* Abengoa Chile. Departamento de Prevención de Riesgos. Estándar de seguridad para inspección mensual de equipos críticos. Chile: September, 2008
* Abengoa Chile. Departamento de Prevención de Riesgos. Estándar de seguridad N?24: Flujograma de accidentes. Santiago, Chile: October, 2010
* Abengoa Chile. Departamento de Prevención de Riesgos. Flujograma de Comunicación y Respuesta ante Emergencias.
* Abengoa Chile. Departamento de Prevención de Riesgos. Flujograma de comunicación ante emergencias.

* Abengoa Chile. Factura #4500593881 Transportes Santa Angela L. Chile: 2014.
* Abengoa Chile. Factura #4500614450 Transportes Santa Angela L. Chile: 2014.
* Abengoa Chile. Factura #4500623570 Transportes Santa Angela L. Chile: 2014.
* Abengoa Chile. Factura #4500648572Transportes Santa Angela L. Chile: 2014.
* Abengoa Chile. Ficha de Evaluación Continua de proveedores.
* Abengoa Chile. GEI-PE 003: Determinación de las Emisiones de GEI de los Bienes y Servicios suministrados a Abengoa Chile / Emisiones de alcance 3. By Karen Garrido. Santiago, Chile: Februrary, 2013.
* Abengoa Chile. Informe N1: Asesoría y Monitoreo Arqueológico Proyecto Planta Solar Cerro Dominador. By Claudia Silva Díaz, Archeologist. June 30th, 2014.
* Abengoa Chile. Informe N2: Asesoría y Monitoreo Arqueológico Proyecto Planta Solar Cerro Dominador. By Claudia Silva Díaz, Arqueóloga. July 15th, 2014.
* Abengoa Chile. Informe N3: Asesoría y Monitoreo Arqueológico Proyecto Planta Solar Cerro Dominador. By Claudia Silva Díaz, Arqueóloga. July 31th, 2014.
* Abengoa Chile. Plan de Contingencia para el Transporte de Sustancias. Chile.
* Abengoa Chile. Procedimiento Ejecutivo: Determinación de las Emisiones de GEI de los Bienes y Servicios Suministrados a Abengoa Chile (Emisiones de Alcance 3). By Karen Garrido. Chile: February 19th, 2013.
* Abengoa Chile. Procedimiento General de Seguridad y Salud en el Trabajo: Reglamento Especial para Contratistas y Subcontratistas. By Leonardo Virán, Carolina Zuniga, and Juan C. Lopez. Santiago, Chile: October, 2010
* Abengoa Chile. Proyecto: CSP Atacama 1. Accesibilidad, seguridad y señalización.
* Abengoa S.A. Imágenes Aplicación Sostenibilidad. October 18th, 2010.
* Abengoa SA. “Nuestro Compromiso”. Accessed in March 2015, http://www.abengoa.es/web/es/compania/nuestro_compromiso/
* Abengoa SA. Informe Anual 2013 Abengoa S.A. Accessed in March 2015. 8. http://www.abengoa.es/export/sites/abengoa_corp/resources/pdf/gobierno_corporativo/informes_anuales/2013/Tomo2/2013_Tomo2_IA.pdf.
* Abengoa SA. Registro de actividades. Chile: July, 2014
* Abengoa Solar Chile. Matriz de Permisos de Proyectos CSP CD 110.
* Abengoa Solar Chile. Plan de Gestión de Seguridad y Salud Ocupacional Proyecto CSP Atacama 1. Santiago, Chile: August, 2014
* Abengoa Solar Chile. Registro de actividades. Santiago, Chile.
* Abengoa Solar. Informe Técnico: Análisis y Resumen Estudio Geotécnico CSP Atacama 1. By J. Ibarra. August, 2014.
* Abengoa. Análisis de Riesgos asociados al Cambio Climático: La protección de los activos de Abengoa. October, 2014
* Altermia Asesores Técnicos S.L. Certificado de Altermia relativo al requisito establecido en el apdo. 5.2.1.3 del Pliego de Licitación del “Concurso Planta Solar Térmica de Concentración Solar de Potencia” convocado por CORFO. Madrid: September, 2013
* Cámara de Diputados de Chile: Unidad de Diagnostico Parlamentario / Departamento de Evaluación de la ley. La desertificación en Chile. Valparaíso: November, 2012.

* CORFO. Resolución N?26: Aprueba bases y sus anexos del 'concurso planta térmica de concentración solar de potencia'. Santiago, Chile, 2012.

* CORFO. Resolución N?398: Deja sin efecto la Resolucion (A) N26, de 2010, de CORFO; Ejecuta parcialmente acuerdo de consejo N2542, modificado por el acuerdo del consejo N2746, de 2012; y aprueba bases y sus anexos del 'concurso planta térmica de concentración solar de potencia'. Santiago, Chile: October, 2012.

* CORFO. Resolución N?60: Aprueba convenio de subsidio con Abengoa Solar Chile S.A., para la ejecución del proyecto denominado "Planta Solar Cerro Dominador", del "concurso planta terminca de concentración solar de potencia". Santiago, Chile. August, 2014.

* DIA Central Termosolar. Informe de Calidad del Aire. By Ignacio Goic. May, 2013.

* Dirección de Vialidad, Ministerio de Obras Publicas, Gobierno de Chile. ORD N?1349. Carta N 0951/14. Materia: Diseño para acceso en Ruta 25 y Ruta B-225 para Proyecto Planta Solar Cerro Dominador. Antofagasta, Chile: August

* Fernández, María José. Informe de Inspección Arqueológica Proyecto Solar Cerro Dominador Comuna de María Elena – II Región De Antofagasta. Chile: December 2013.

* Fundación Chile. Acuerdo de entendimiento entre Solar Energy Research center (CERC-Chile) por Fundación Chile y Abengoa Solar Chile S.A. Santiago, Chile: 2013.

* KV Consultores. Extracto estudio geotécnico del proyecto. S/F.

* Labotec Ltda. Informe de Análisis Físico-Químico. June, 2014

* Larraín, Sara, y Pamela Poo, Ed. Conflictos por el agua en Chile: Entre los derechos humanos y las reglas de mercado. March, 2010.

* PE y C. D.5. Formato de Diagnóstico de Sede/País. Focus Abengoa. Santiago, Chile.

* Robles Gallego, María del Mar. Emisiones CO2 planta Chile. Mail to the evaluation author. September, 2014.

* Ruido Ambiental, Servicios de Acústica. Estudio Acústico Proyecto Planta Cerro Dominador. Informe realizado para Sustentable SA. Antofagasta, Chile: April, 2013

* Servicio de Evaluación Ambiental, Gobierno de Chile. Resolución Certificación Ambiental N?0231. Antofagasta, Chile: April, 2014.

* Sustentable S.A. Adenda N°2 Declaración De Impacto Ambiental Proyecto Planta Solar Cerro Dominador y Anexos. Abengoa Solar Chile. Santiago, Chile: March, 2014

* Sustentable S.A. Informe Biótico Proyecto Planta Solar Abengoa. By Juan José Sáez y Constanza Méndez. Santiago, February 2013. Plano de localización.

* Sustentable SA. Adenda N°1 Declaración De Impacto Ambiental Proyecto Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: February, 2014.

* Sustentable SA. Declaración de Impacto Ambiental Proyecto (DIA) Planta Solar Cerro Dominador. Abengoa Solar Chile. Santiago, Chile: December, 2013.

* Sustentable SA. Informe de Paisaje Proyecto Planta Solar Cerro Dominador. By Juan José Sáez. Santiago, Chile: February, 2012

Drawings
* Abeinsa EPC / Abengoa Solar Chile. Dibujo #:0043-PLN-ATP-00-56-001. Sistema de captación y conducción de aguas de lluvia. January, 2014.
* Abeinsa EPC / Abengoa Solar Chile. Dibujo #:0186-PLN-UTE-000-050-0001. Camino de acceso a la planta (planta y levantamiento). July, 2014.
* Abeinsa EPC / Abengoa Solar Chile. Dibujo #:0186-PLN-AEE-000-000-0002. General Layout Base de Vida. July, 2014.
* Modulcea. Planos Campamento en Chile (Edificios). Client Abener y Teyma. June, 2014.