Proceedings World Geothermal Congress 2020+1
Reykjavik, Iceland, April - October 2021

The Role of Stakeholder Engagement in Geothermal Exploration Practices in Tolhuaca, Chile

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Keywords: stakeholders, stakeholders' perception, geothermal exploration, best industry practices

ABSTRACT

Chile, one of the countries with the greatest geothermal potential lies in the southern hemisphere, with aspirations of achieving up to 5.2 GW of power generation from geothermal energy by 2030. Several geothermal exploration projects have been developed and social opposition was observed especially among indigenous communities. Still stakeholder engagement and stakeholders' response have not been deeply studied. By Analysing geothermal companies' practices in stakeholder's engagement it is more helpful to identify approaches that lead to a positive social perception of the projects. The objective of our study was to describe the company´s practices of the Tolhuaca Volcano project, one of the most prominent projects in South America. The project was located in southern Chile and it was expected to install a 70 MW power plant by 2015. Our paper also focuses on describing the engagement practices and stakeholders' perception to them through a qualitative approach. The testimonies of 26 stakeholders were collected through five focus groups and eight semi-structured interviews.

Our case analysis shows the influence of stakeholder engagement practices on stakeholders' perception of the project. Each component and respective outcomes of the engagement process followed by Geo Global Energy Chile and Mighty River Power were studied. The project developers had a proactive attitude in terms of stakeholder engagement. Some of the implemented measures had a positive impact on some stakeholders and others did not. We compared our results with existing regulations and standards for stakeholder engagement in Chile and best practices from an international literature review. Our findings suggest that similar perceptions may be expected in other places of southern Chile due to their similar contexts. This study highlights the relevance of establishing engagement practices before the exploration drilling starts. Stakeholder engagement should be conducted in an appropriate way according to the local social context. Thus, social perception may ultimately be steered in a positive direction.

1. INTRODUCTION

1.1 Status of geothermal energy in Chile

The potential of geothermal power production growth in Chile is promising. The total installed electricity generation capacity in Chile is 22,535 MW divided in three main grids from North to South, from which approximately 54 % comes from fossil fuels, mostly imported; however, the country is aiming for 70 % production of electricity from clean energy sources by 2050 (Generadoras de Chile 2017; Ministerio de Energía 2016b). Chile is ranked as the country with the highest investments in renewable energy and climate change mitigation among the emerging economies worldwide, according to the Climate scope Emerging Markets Outlook 2018 (Bloomberg New Energy Finance 2018). In this context, geothermal power could play a pivotal role. The estimated potential of geothermal energy accounts for 16 GW with temperatures above 150°C (Lahsen, Muñoz, and Parada 2010). It has been estimated that the Chilean portfolio will share between 1.7 and 5.2 GW of geothermal energy by 2030 (Almarza, 2014). In 2017, the first geothermal power plant of South America, Cerro Pabellon, with a total installed capacity of 48 MW was inaugurated in northern Chile ("Enel y ENAP inauguran Cerro Pabellón, la primera planta geotérmica de Sudamérica" 2017).

Although, the geothermal development in Chile continues to grow. By 2018, 12 concessions for exploitation and 8 for exploration were active (Servicio Nacional de Geología y Minería 2018). In this paper the term exploration refers to the search of deep geothermal resources, which includes drilling operations. Furthermore, the Ministry of Energy presented in 2019 a geothermal law reform to promote the realization of new low enthalpy projects and the continuation of the existing ones.

1.2 Chilean standards for stakeholder participation in energy projects

In this paper we refer as stakeholder to a group of people who are economically and/or culturally affected by or can affect the realization of a project and has certain interest in it (Cuppen et al., 2015). While with the term "community" we refer to "people who live within and identify with the geographic area surrounding the proposed site"(Lane and Hicks, 2017). The community may include several stakeholders.

In 2016, a guideline of suggestions for participation in energy projects was published by the Chilean Ministry of Energy. This guideline highlights six principles that must be fulfilled by any energy project: inclusiveness of all local communities in the engagement process; opportunity and relevance, that is the early and constant participation of actors so that the project can be improved if necessary; transparency in the engagement process by providing clear, complete and trustworthy information to all actors; decision-making power of actors in the project whenever the project may impact their life; participative planning throughout the project's lifetime; and the promotion of the local social and economic development according to the local development plans

(Ministerio de Energía 2016a). Additionally, this guideline suggests the establishment of a dialog with the local communities before the project is assessed by the regional environmental regulator (SEIA) and for at least six months, so that the project's plan considers the actors' interests and needs.

In 2018, the Chilean Ministry of Energy published the report "*Plan Mas Energia"*, which outlines the technical, environmental and social criteria required to ensure the sustainable development of energy projects. The objectives of this guideline set international standards on the project's decision making. These objectives overlap with the Guidelines mentioned above though they additionally incorporate the procedures to do an inclusive stakeholder mapping, a decision-making process between the State, project owners and communities, and a technical assessment of power generation and transmission before, during and after the environmental assessment by the SEIA. Furthermore, three stages are described along the development of energy projects: before the environmental impact assessment, during, and after (construction, operation and completeness of the project). Some innovations to the current process: the establishment of a project's website which would contain all certificates, and permits other than the environmental impact assessment (which already exists); mechanisms for the dialog between energy projects with environmental approval and local communities; the promotion of initiatives to push the local economy; and a communication process during the closing stage of the project that addresses the economic, environmental and social issues with the local authorities and local stakeholders (Ministerio de Energía, 2018).

1.3 Best practices for stakeholder engagement in energy projects

A short review of best practices for public engagement in both renewable energy and specifically geothermal energy projects worldwide was done, showing that the same fundamental principles are shared between such reports. The studies reviewed here were based on stakeholder engagement. The general stages that were identified include: 1) planning, informing and assessing, 2) integration, execution, mitigation, and monitoring, and 3) evaluation of outcomes.

Before starting the project, the first stage is executed by informing the stakeholders about the project and identifying their views. As described by Lane and Hicks, a social assessment has to be performed to understand how wide the geographic area that englobes the community concerned by the project is (2017). An early communication is pursued, in which the stakeholders are informed about the project by the project developer and with the participation of regulatory bodies. In the context of indigenous populations in Chile, establishing an early public consultation with the indigenous communities is mandatory, according to the National Law 19.253; however, going beyond the regulations is encouraged by experts (Morton and Abogabir 2015; Lane and Hicks 2017). Additionally, the social feasibility of the project is assessed, in which the extent of the required engagement is defined, and the stakeholders' hopes, fears, perceptions, concerns, questions, values and goals are identified (Lane and Hicks 2017; Smith et al. 2018; Wallquist and Holenstein 2015; Morton and Abogabir 2015).

The second stage of the engagement process takes place during the project development. All the information that was gathered in the first stage is integrated in the engagement plan, by involving the identified stakeholders in the process. For example, a geothermal project located on Maori land in New Zealand, the iwi (tribe)'s decision-making process was adopted by the developers in a geothermal development model (Hikuroa et al. 2010). Smith et al. 2018 suggest that an engagement plan has to be defined in the long term, above a 50-year span. In cases where stakeholders are not organized, the project developer shall facilitate such organization and promote an agreement among them (Morton and Abogabir 2015; Smith et al. 2018). Furthermore, the constant monitoring of the project and stakeholders' views, the mutual learning between developers and stakeholders, and the establishment of mitigation measures for possible negative impacts have shown to have a positive outcome in the engagement process (Smith et al. 2018; Batac and Dugan 2015; Wallquist and Holenstein 2015; Lane and Hicks 2017; Morton and Abogabir 2015).

The last stage consists on assessing the outcomes of the engagement process and it also takes place throughout the project development. In general, positive impacts are expected for the project and the involved stakeholders. An important outcome is the attainment of a social license or approval (Smith et al. 2018; Lane and Hicks 2017). One way to assess the level of achievement of this outcome is by asking the stakeholders to provide letters that describe their support to the project (Lane and Hicks 2017). Other benefit for the project may be the de-risking of possible social disapproval, of delays and of legal suits (Smith et al. 2018). As for the stakeholders, some potential positive outcomes are the ownership of the project, the sharing of benefits, and improved living conditions (Smith et al. 2018; Batac and Dugan 2015).

As pointed out by Lane and Hicks (2017), there is no one-size-fits-all approach to bring on board communities in energy projects since every case must be treated as a new one; however, examples that have brought positive results have been mentioned above.

One of the reasons to promote stakeholder engagement for the implementation of energy projects is that it can contribute to improve the perception of these projects (Flynn, Bellaby, and Ricci 2010). However, stakeholder engagement processes themselves are subject to stakeholders perceptions, and the way the process is perceived might also influence the perception of the whole project (Rowe and Frewer 2005). This paper assesses how stakeholders perceived the engagement strategy of a geothermal company that carried out an exploration project in their community.

2. CASE DESCRIPTION

The focus of this study was the evaluation of stakeholders' perception of the stakeholders' engagement strategy carried out on the Tolhuaca volcano, in the Araucania region, Chile, between 2009-2016 by Mighty River Power (now Mercury Energy), a New Zealand electricity generator, and its past filial company Geo Global Energy Chile (GGE Chile).

The Tolhuaca project began with geothermal exploration in 2009 and despite having the environmental approval and the confirmed potential of 70 MW, the project was cancelled in 2015 because of financial difficulties (Almarza Farías 2014; Whineray 2015). The Tolhuaca geothermal field is located at 2000 m up on the Tolhuaca volcano, a place that reaches minus 18°C in winter. In 2009, GGE obtained the 1-year-valid exploration license and, with the aid of a helicopter, drilled the first slim hole down to 1000 m depth. In 2010, GGE got the non-expiring exploitation license, built a road to connect the geothermal field with the closest

highway, and drilled the second slim hole with the aid of trucks. By 2013 GGE drilled 2 deep wells down to 2500 m, obtained the environmental approval from the SEIA, and MRP overtook the project. Even though the geothermal potential was confirmed, and a 70 MW plant was planned, some problems were threatening the future of the project: the restructuring of MRP, the high operation costs, the uncompetitive electricity price, the lack of subsidies from the Chilean government, among others (Ormad 2013). In the next years, activities ceased on the geothermal field and by 2016 the project was officially cancelled. The timeline of the project is shown in Figure 1.

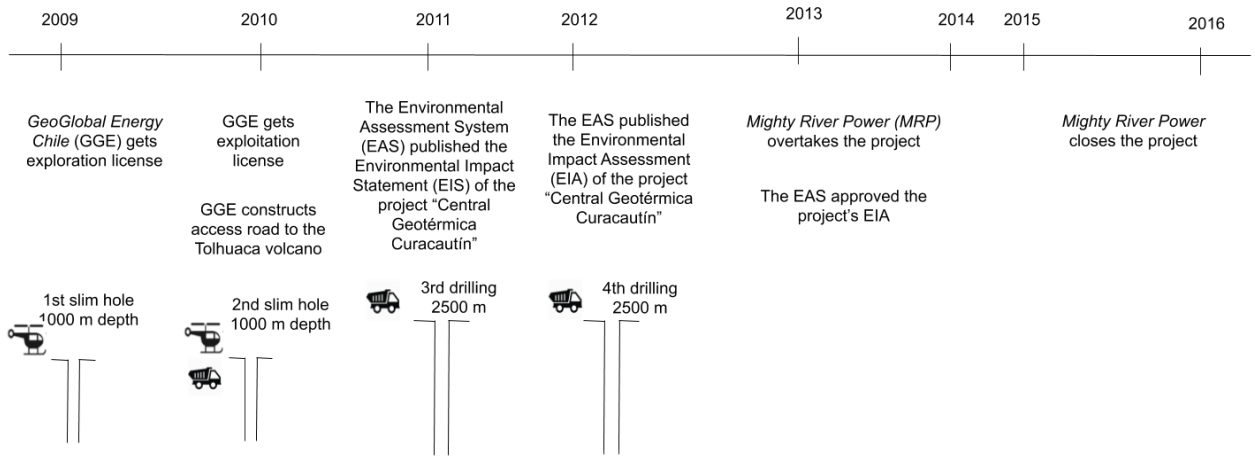

Figure 1. Tolhuaca project's timeline.

GGE Chile and MRP approached stakeholders from Curacautin to build acceptability. Curacautin is a rural commune located 42 km away from the Tolhuaca geothermal field in the Araucania region, 31.7% of the population is from the Mapuche indigenous community. Curacautin has a population of 17,221 inhabitants main economic activities are cooperatives, and business related to ecotourism, and whose poverty level is 20%, twice as high as the National median (Ministerio de Desarrollo Social y Familia 2018) It was well-known among the geothermal community in Chile that GGE-MRP approached the stakeholders, though neither their opinion was known, nor the company's approach assessed.

2.1 Objective

The aim of this study was to:

i. To disentangle the stakeholder engagement strategy employed by the geothermal company and
ii. To understand how it influenced stakeholders' perception.

2.2 Research questions

Each objective was addressed by answering the following research questions. Firstly, the story of the project was drawn, the company activities described as well as the role of each interviewed stakeholder. The questions are listed below.

i. Describing company's practices on stakeholder engagement
    a. What were the project milestones that the stakeholders remembered?
    b. What activities did the company implement for the engagement of stakeholders?
    c. How and who was involved in the communication process?
ii. Describing stakeholders' perception
    a. How was the stakeholder engagement process perceived?
    b. How did the stakeholder engagement strategy influence the social perception of the project?

3. METHOD

3.1 Collection of information

In June 2018, semi-structured interviewees and focus groups held during a field work in Curacautin were run with representatives from local interest groups who were involved in the Tolhuaca exploration project. Participants were chosen through a stakeholder mapping and a snowball sampling exercise. In total 27 stakeholders participated in this study. During the time of the project, participants represented were public relations of GGE Chile, local NGOs, a non-indigenous residents association, local authorities, the local tourism association, a nearby indigenous group, and the landowner of an extension of the geothermal exploration concession. The participants' code and the type of interview are described in the Table 1.

The testimonies of interviewees were obtained through semi-structured interviewees and focus groups during a field work for 10 days in Curacautin. Participants were asked to remember their very first impressions of the project up until the last information they remembered regarding the project, with particular emphasis on the interaction between GGE-MRP and the stakeholders. At the same time, they were asked to draw a timeline of memories they had of the project on a blank paper, by implementing the storywall

tool (Swiss Academy of Sciences n.d.) Additionally, this paper included a document analysis of mainly official documents from GGE Chile that were employed to communicate the project, Chilean Environmental regulations documents and press articles issued from 2008 to 2014 by two local newspapers (El Diario Austral de Temuco, and Las Noticias de Victoria) and online articles were reviewed as a background and to build the project's timeline.

3.2 Analysis of information

The analysis of data consisted of five steps of a qualitative analysis described by Robert Yin: compilation, disassembling, reassembling, interpretation and conclusion of the information (Yin 2011). Firstly, the testimonies and other collected data sources were organized by implementing open coding with the software NVivo 12 Plus ("NVivo 12 Plus" n.d.). Secondly, the events that participants mentioned were ordered chronologically, and from the pool of information, the GGE-MRP's stakeholder engagement strategy was described. Thirdly, participants' perception of the project was identified. Fourthly, events that permeated social perception were described, ultimately, identify good-perceived industry practices. Finally, current and past (valid during the project execution) regulations were reviewed to assess the work done by GGE Chile and MRP in terms of stakeholders' communication and environmental impact.

Table I. Stakeholders' code and type of interview implemented.

CODE	STAKEHOLDER'S NAME	ROLE	TYPE OF INTERVIEW	PARTICIPANT NO.
NR	Nearby residents' association	They live in the access to Tolhuaca.	FC + TM	3
LA 2	Local authority 2	In charge of controlling forest activities in Curacautin. They were assessing people from NC about forest activities.	FC + TM	4
NGO 2	Ecological NGO 2	They seek for preserving the environment. They are members of NGO 1.	FC + TM	4
TR	Tourism companies	Eco-tour guides of Curacautin	FC + TM	5
DR	Distant residents' association	They live in Curacautin.	FC	3
SR	Stakeholder relationships	GGE-MRP's employee in charge of stakeholder relationships.	SI + TM	1
GE	Geologist of GGE	Employee of the company.	SI + TM	1
NGO 1	Ecological NGO 1	Representative of a group of 18 NGOs from Curacautin.	SI + TM	1
BC	Business companies	Members of NGO 1. Even though they were present, they decided not to give their opinion.	SI	1
LO	Landowner	Owner of the territory covered by the exploration and exploitation license.	SI	1
IN	Indigenous group	Mapuche community that lives close to Curacautin.	SI	1
LA 1	Local authority 1	In charge of assessing the mayor.	SI	1
SE	Regional environmental regulator	They evaluate the Environmental Impact Assessment reported by the companies.	SI	1
TOTAL	**13 stakeholders**		**5 FC + 8 SI**	**27**

3.3 Ethics

An informed consent was distributed among the participants. They all were told that this study was completely independent of any company's interest, the objectives were driven by academic interests, and that any possible harm to participants would be avoided. Their participation was anonymous and completely voluntary.

4. RESULTS

According to participants' testimonies and other collected documents, GGE-MRP implemented a stakeholder engagement strategy that was stakeholder-selective. Stakeholders showed a different level of participation in such engagement strategy, understanding of the project, as well as different opinions about it. Following, GGE-MRP's practices with the stakeholders are described, the stakeholders' perception is analyzed and the relevant points that permeated stakeholders' perception are outlined.

4.1 Description of firm's practices in Tolhuaca

The strategy of GGE for stakeholder engagement was firstly, to approach the landowners, authorities, and the residents' association near the Tolhuaca volcano, and once the project had started, GGE held meetings with the rest of the stakeholders and kept communication with the stakeholders while the project was running. Before the start of the project, GGE approached the landowner (LO) to agree upon which terms GGE would be able to access to the LO's territory. In Chile, the geothermal energy belongs to the State, that is, if a geothermal (exploration or exploitation) license is given, the license's holder has the right to access to this resource and has to sign a lease with the landowners. Once the exploration started, the first stakeholder that was approached was the nearby residents' association (NR), who live on the volcano basement, on the way to the geothermal field. Similarly, the local authority (LA1) was informed about the project. We labeled these approaches as "preliminary meetings", because, according to Stakeholder Relationship employee (SR), the official engagement strategy started after the exploitation license was obtained in 2010. In the second set of meetings, GGE provided information about the project and the plans to build a power plant on Tolhuaca. The attendants of these meetings were the NGOs (NGO 1 and 2), the distant communities who live in Curacautin (DR), the indigenous communities (IN), among others. The next meetings were held by the SEIA in 2011 as a request of the NGOs and the NR. During these workshops, the project's EIS (Environmental Impact Statement) reviewed, and the need of developing an EIA (Environmental Impact Assessment) was discussed. According to the Chilean law, any power generation project whose capacity is greater than 3 MW must present an EIS or EIA to the SEIA; the Tolhuaca project had to present an EIA. In 2012, GGE offered guided visits through the geothermal field for the stakeholders to see the installations and the impact of the project to the surroundings. After such visits, workshops were held by the SEIA and GGE for the NR, DR, NGOs and IN, that did not participate in this study, to review the EIA. Afterwards, the LA1 and NGOs published their observations on the project's EIA, in which they expressed how the project impacted the environment. The last meeting was held by GGE and it was attended by the LA1, NGOs and the NR: GGE expressed its intentions to finance community projects and to offer scholarships for local students. Afterwards, there were no more meetings and the project started to slow down. A couple of years later, the project was closed. All the meetings are shown chronologically in Figure 2.

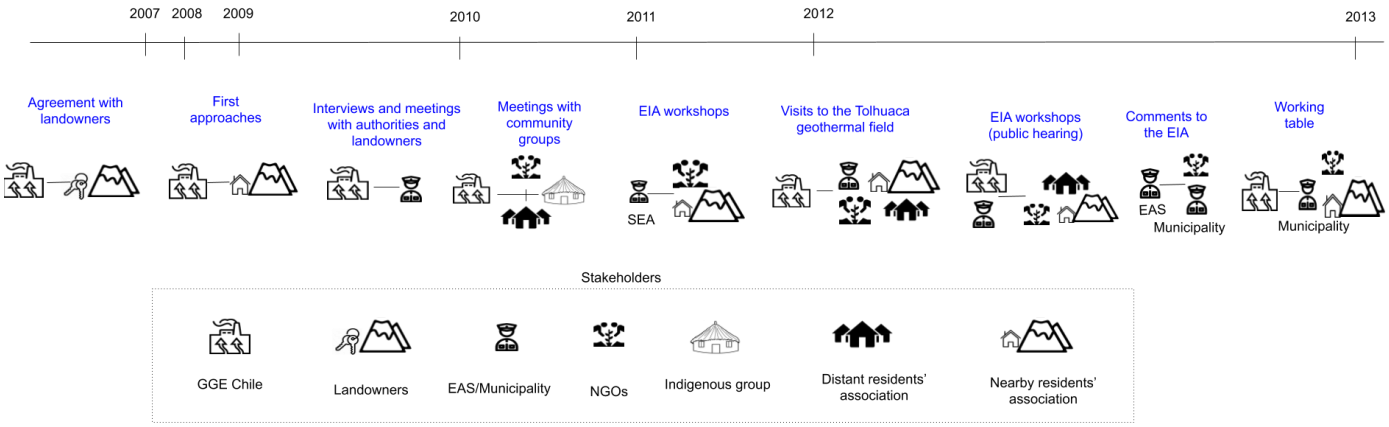

Figure 2. Stakeholder engagement approach of GGE-MRP.

4.2 Stakeholders' perception of engagement practices

Stakeholders' perception of the project revealed the diversity of the participants' preferences. Neutral, negative and positive perceptions were perceived. The connections of such perception with the engagement strategy were: first realization of the project, that is how did people find out about the project; knowledge, how much information about the project was provided during the interview or focus group; involvement, which organizations were involved during the engagement activities; and direct benefits offered by the company. Following, each aspect is outlined and the results for each stakeholder are shown in Table 2.

4.2.1 First realization

Participants that were not informed about the project before initiating drilling operations (2009) showed distrust towards the company. The first memory that crossed interviewees' mind when filling up the timeline was the first image they had of the project. They were asked to remember how they found out about the project. It was evidenced that the company did not approach most of the interviewed stakeholders before drilling. Touristic companies (TR), the ecological NGO 2, local authority 2 (LA2), indigenous group (IN), and the distant residents' association (DR) said that they first noticed the helicopters flying over Tolhuaca, and the lights of trucks going up and down on the volcano. By the time the trucks were running on Tolhuaca, the company was already drilling the second well of 1000 m depth. This indirect realization created a first-negative impression on these stakeholders. They expressed their concerns about the possible environmental impact of the company's work on Tolhuaca, the generated distrust towards the company and the feeling of being disrespected for not having been informed on time. At the same time, the landowner

(LO), local authority 1 (LA1), and the neighboring population to Tolhuaca (NR) reported to have received a talk from the company as first approach. The LA1 and NR acknowledged the open communication and transparency of the company.

4.2.2 Involvement and understanding

There is not straightforward relationship between level of involvement and understanding, and perception. However, involvement and understanding levels were directly related. The involvement of stakeholders was evaluated in terms of their participation in meetings, workshops and observations on the Environmental Impact Assessment. The most involved stakeholders were LA 1, NGO 1, DR, TR, NGO 2, and NR, and the least involved were LA 2, LO and IN. The level of understanding about the project may have been influenced by interests or involvement in the engagement process. According to the testimonies, participants knew more about the early stage of the project whereas almost nothing about the project closing. From 2011, GGE was unsure about continuing the project (due to the problems mentioned in the Case Description) and therefore almost no more meetings were organized afterwards. One can see that those who had a moderate or high involvement throughout the project lifetime had the highest understanding of it. The overall level of involvement and understanding of each stakeholder is shown in Table 2.

4.2.3 Benefits

Part of the public engagement strategy was the offer of direct benefits to the communities near Tolhuaca. A foundation that would provide 1% of the production revenues was promised to the stakeholders. As mentioned in the Case Description, this project was developed in a low-income area. According to the NR, the project brought jobs and other benefits such as the access road and some economic donations. As for the landowner, an economic agreement was established with the company. The perception of benefits, mentioned in Table 2, did not have a straightforward relation with perception. Some stakeholders perceived positively the project's active phase because GGE-MRP hired local people and offered certain help to the nearby communities; however, some others questioned the ultimate impact of the number of job positions in the long term for the community. Offering benefits can lead to the creation of expectations, which is a double-edged sword: at the beginning of the project, the distant residents' association thought that they would have access to cheaper energy and more job opportunities; however, as the project evolved, stakeholders found that they would not get cheaper electricity, and that the jobs would not be suitable for the local population, and thus the high expectations did not create a positive perception on them.

"There is nothing to criticize about the company. They were good and provided help to the community. They were always willing to help". ("No hay nada que criticarle a la empresa. Ella fue buena, ayudó a la comunidad. Siempre estuvo dispuesta a aportar")
Member of the neighboring residents' association.

Table *2*. Variables of the stakeholder engagement strategy.

Stakeholder	First realization	Understanding	Involvement	Perceived benefit (s)
NR	Directly	Medium	Moderate	Jobs/Funding for nearby communities/ Scholarships
LA 2	Indirectly	Low	Low	Jobs/Scholarships/ Funding for nearby communities
NGO 2	Indirectly	High	Moderate	-
TR	Indirectly	High	Moderate	Jobs/ Funding for nearby communities
DR	Indirectly	Medium-High	Moderate	Funding for nearby communities
NGO 1	Directly	High	Moderate	-
LO	Directly	Low	Low	Jobs/Financial agreement
IN	Indirectly	Low	Low	-
LA 1	Directly	High	High	Funding for nearby communities /Direct uses of geo-energy/ Scholarships

5. DISCUSSION AND CONCLUSION

The research questions were answered. According to the participants' testimonies and collected material, the project milestones that the stakeholders remembered corresponded to the engagement activities organized by GGE-MRP. These activities covered meetings, in which the company informed about the project and guided visits to the geothermal field. The stakeholders involved

were the landowners of the exploration area, local politicians, NGOs, and indigenous and non-indigenous communities. The number, date and participation of these activities varied among stakeholders, as shown in Figure 2. Regarding stakeholders' perception of the engagement strategy, the results showed that the effect of such engagement strategy on stakeholders was non-supportive for the project. This result is relevant for geothermal developers and policy makers because though GGE and MRP employed an engagement strategy that went beyond the Chilean regulations of 2009-2014, some aspects of the engagement process such as, the time of involvement, the level of participation and the offering of benefits generated conflicts among the stakeholders.

One missing point of GGE-MRP's engagement strategy was the complete inclusiveness of all stakeholders throughout the project, from the beginning to the end. According to the Chilean and the international standards for engagement practices, in order for a public engagement strategy to build acceptability among stakeholders, it must start at an early stage of the project, involve the stakeholders and inform them about risks and benefits in a balanced way (Ministerio de Energía 2016a; Wallquist and Holenstein 2015). These points also came out in this study: stakeholders who were not informed about the project before GGE started drilling, expressed concerns about the potential environmental impact and distrust toward the company. We agree with Lane & Hicks (2017) on assessing the project feasibility among the stakeholders before the project execution and we also agree with the Chilean standards of 2018 that indicate that a dialog between the local communities and project developers has to be established before the project's execution (Ministerio de Energía 2018). We complement this point by suggesting that engagement practices for geothermal energy projects should start before the intensive exploration work, that is before drilling activities, so that myths and misunderstandings among the surrounding communities are avoided.

Another controversial point is the offering of benefits to the nearby communities. GGE-MRP financed a couple of community projects and was planning to share certain amount of the revenues to the nearby communities. This point is extensively encouraged by the Chilean engagement standards of 2018, which suggest the realization of medium- and long-term projects with the stakeholders to promote the local economic development (Ministerio de Energía 2018). Additionally, the results show that special care must be taken on the expectation control when communicating geothermal projects, especially in contexts characterized by high level of poverty and unemployment.

The proper communication of project failure is necessary to not jeopardize the trust towards the project. As the GGE-MRP's engagement strategy showed, during the project development the interactions with the stakeholders were fluid; however, when MRP decided to sell the exploitation license due to financial reasons, the stakeholders did not properly receive that information. The lack of information impacted the stakeholders' trust and opened the door to local myths about the project closing. The Chilean engagement standards of 2018 address this issue by stating that the company must hold communication process with the local authorities and local stakeholders during the project's closing stage (Ministerio de Energía 2018). This point is relevant because, as pointed out by Flynn et al. (2010), the perception of the engagement practices permeates the perception of these projects, which may ultimately permeate the perception of future projects.

Thus, a stakeholder engagement that includes all groups that are affected by or may affect the project, that informs and creates trust prior the exploration drilling, during the execution and at the end of the project, and that agrees with local development plans will help shape a positive perception of the project, and by doing so, both stakeholders and companies may receive and share benefits such as improved living conditions, de-risked delays and legal suits. (Smith et al. 2018; Batac and Dugan 2015).

Though this case study is not a recipe to build a positive stakeholders' perception of geothermal projects, since perception is constructed in a more complex way that involves multiple variables that go beyond this analysis, it does provide, as described by Lane and Hicks (2017), insights for a proactive stakeholder engagement process that goes in the right direction.

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