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Fighting the Information Gap and the Steam Monster, the Chilean Experience on Geothermal Outreach

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ABSTRACT

A 60 meter uncontrolled steam discharge was accidentally activated in El Tatio geyser field, one of the most popular touristic destinations in Chile, in 2009, during some tests in an old exploration well. Prior to this incident, geothermal energy was virtually unknown to the general public. As a result of this event, most of the press and people in the community called the event an ecological disaster and the perceived geothermal threat to the environment remains vivid in Chilean public opinion. Taking into account this complex scenario, the present work reviews and compares the different communication strategies that the public and private sector have developed to achieve public acceptance of geothermal as a reliable energy source in Chile, a country with an enormous, untapped geothermal potential.

1. INTRODUCTION

Geothermal energy is the least known, most ignored yet most reliable and abundant local renewable energy source in Chile. Geological studies in the north and central-southern volcanic geothermal zones show a preliminary assessment of Chilean geothermal potential to be about 16,000 MW. To date, geothermal energy only has only been exploited locally for recreational purposes (Lahsen, 1986). Development of geothermal energy in Chile is an urgent challenge, because the country requires local, clean, reliable, and long-term energy sources. Currently Chile has very limited energy resources, and depends on oil imports, with heavy reliance on hydroelectric power, which has sometimes proven unstable due to climate factors. The geothermal law (law No. 19.654) was enacted in 2000, yet 14 years later we have 0 kilowatts produced with geothermal. Even though geothermal exploration is very active, with 75 exploration and eight exploitation concessions granted by the Ministry of Energy, none of them is productive to date. The most optimistic projections state the first plant will be active by 2017.

At this stage of the debate, most proposals on how to push forward geothermal energy development revolve around technological, regulatory, and financial issues, yet little has been devoted to increasing social acceptance of this energy source. Does the Chilean public supportive of this technology? The truth is, the public hardly even knows about its existence and, consequently, the number of citizens demanding its development are few, although in the last two years, the country has witnessed a considerable number of active Chileans marching regularly in favor of more renewable energy and the end of coal plants and big hydroelectric plants. Social acceptance of geothermal energy is crucial for the realization of any project (Cataldi, 1999). Despite economic, technological, and regulatory factors that are also essential for the development of geothermal energy, social perception and awareness are key to creating geothermal projects (Bridle et al., 2013).

To date, social perception of geothermal energy in Chile has followed the global trend of receiving little public attention compared with other renewable energy y sources, such as solar and wind power, and geothermal has not played a prominent role in public debates on renewable energies (Gross, 2012). Geothermal development has also been affected by a negative perception by the community, lack of understanding about its core concepts, and by unfavorable press publications (Dowd et al., 2011). In this context, while geothermal exploration in Chile dates back to the early twentieth century, it erupted fiercely in the national agenda only in 2009, becoming instantly infamous, after a 60-meter uncontrolled steam discharge was accidentally activated for 27 days in an old well in the El Tatio geyser field during exploration activitie by the company Empresa Geotérmica del Norte.

The incident generated great media and social commotion, creating a harmful relationship between the word “geothermal” and the concept “damage to the environment” because this accident occurred in an area of high ecological and touristic value to the country. As a result, the geyser field was, declared an interest zone in 2002 and a protected area in 2010. At the beginning of October 2009, the senate held a special meeting to discuss the El Tatio incident, and asked the President to declare the area a National Monument. The Senator José Antonio Gómez even announced the possibility of a lawsuit for environmental damage (before any report on environmental damage was released). The local communities along with the touristic operators organized protests, and even a couple of social leaders and representatives from northern indigenous communities – Sonia Ramos and Amelia Mmamani- walked nine days from San Pedro de Atacama to Santiago to demand that the President to end all geothermal explorations at El Tatio. The walk from “El Tatio Grandmothers”, as the press baptized them, had important media coverage.

While the uncontrolled steam discharge was being managed, the Chilean Ministry of Environment requested an international assessment on the possible effects to the geysers’ or to other environmental components; an evaluation of the company’s management before the event occurred, and recommendations for measures to minimize risks that could affect El Tatio and the

environment, in general. The task was entrusted to the United Nations Development Programme (PNUD), who executed it with an experts' panel suggested by the International Geothermal Association (IGA). The report was released a year later, in October 2010, declaring that the flow from the geysers, and the physical and chemical attributes of the various hot springs and surface activities were not affected by the accident, nor were the flora and fauna of the area. However, the experts did acknowledge that there were several activities that the company did not use during the reinjection process that could have prevented the accident. The panel remarked that there was poor communication among the company, the people interested in the project and the local communities, and that for future geothermal developments, this information gap must be overcome (PNUD, 2010). The release of the report had little impact on the press, as a year had passed since the incident occurred. Also, the politicians who had championed the cause of the "natural disaster" did not mention the outcomes of the report.

Even though the development of geothermal energy in such a sensitive area as El Tatio is debatable, the incident managed to give the Chilean public a bias against geothermal energy, regardless of where it was developed. Geothermal energy translated into a synonym for pollution and environmental threat. The El Tatio incident additionally marks a before and after in Chilean geothermal history, turning something that for decades had been a merely scientific and technical matter into a major social concern. New actors factored into the debate on geothermal energy, introducing unanticipated topics to the discussion. Such changes in a debate redefine the possible consequences of a project and encouraged taking into consideration the concerns presented by more citizens. Arguments and proposals were exchanged by specialists and nonspecialists (Callon et al., 2011). This increased the need to build communication between geothermal developers and the populace. So, what has happened so far in Chile?

2. GEOTHERMAL PROMOTERS

Diverse institutions share responsibility for the development of Chilean geothermal history. The Ministry of Energy, created in 2010, developed the national energy strategy. The ministry grants geothermal concessions for exploration and exploitation and has a division in renewable energies that aims to create the proper market conditions for investments in this area. The Ministry of National Assets (1981) manages public use of patrimony and, along with the Ministry of Energy, promotes the optimal use of state land with renewable energy projects by simplifying assessment procedures. The Ministry of Environment (2010) promotes sustainable development and the protection and conservation of natural resources. The Mining and Geology National Service (SERNAGEOMIN) contributes in the development of mining and geological policies. This Service has a geothermal unit whose role is to register and survey concessions. The University of Chile, SERNAGEOMIN. was the only institution doing geothermal research by the end of the last century (Lahsen et al., 2010). Finally, the Center of Renewable Energies (2009), part of CORFO (state production and promoting corporation), seeks to ensure optimal participation of renewable energies in Chile's energy matrix.

From the onset, the wide variety of organizations involved in geothermal development at a governmental level have worked more against geothermal growth than for it, as most of these organizations are new and still working on being consolidated as valid state institutions. Additionally, some responsibilities scattered and unclear (Clara Szczaranski, personal communication, 4 April 2013).

However, the private sector is the main actor in the Chilean economy and the energy market is no exception: while the State regulates and supervises, the private sector performs all investments, exploration, and exploitation (op. cit.).

Considering this, it is no surprise that most of the communication initiatives and materials aimed for the non-scientist (public, policy-makers, and communities close to geothermal projects, among others) have been developed by private entities. As reviewed below, the communication strategy of most state institutions does not promote geothermal over other renewable energies, even though it is the most abundant and reliable local source of energy in the country. In some occasions, it is ignored and not even mentioned among the available renewable energies.

The creation of the Andean Geothermal Centre of Excellence (CEGA) in 2010 created the opportunity for a public and independent information source on geothermal energy. One of its objectives—along with the generation of scientific knowledge, training of human resources and establishment of state-of-the-art analytical facilities—is to increase public awareness and promote geothermal resources in as a renewable, clean alternative energy. Although the Center is being publicly funded, its existence should not be taken as a public initiative to promote geothermal energy; in order to exist, the scientists who created the center applied to a national call for proposals for new research groups in the country, the budget was awarded, and financing for five years of work was granted. If this group of scientists had not been awarded the funds, it would be difficult to know if any other initiative solely devoted to geothermal research, such as CEGA, would exist today in Chile. In addition, after the fifth year the center might be granted another five years of financial support. However, after this hypothetical 10 years, there is no backup plan (there might be one, but, again, contrived by these particular group of scientists, and not from a strategic plan from the State, as it is in almost every country that has geothermal research centers).

3. WHAT HAS BEEN DONE?

According to Cataldi (1999), the individual and collective opinion towards geothermal energy changes over time depending on the evolution of plant development and/or responces to public opinion manipulation by interest groups who either manage conventional energy sources or foster different energy alternatives. Thus, the economical and social aspects of geothermal energy development must be looked into with great diligence by entrepreneurs who want to build a geothermal energy plant. In Chile, where the private sector manages the energy market with little input from the state (its greater goal is to promote *laissez faire*), this final recommendation by Cataldi fits perfectly. It also is advice for the companies involved in the geothermal industry and reflects what is happening in the country with regard to geothermal development: the crusade for social acceptances has been undertaken mostly by the private companies that are trying to develop the first geothermal plants in Chile. Only few initiatives from the public sector acknowledge the existence of geothermal potential in Chile, but they generally do not highlight this energy source among other renewable energies, as if Chile did not have special conditions for the development of geothermal energy. Even though the National

Energy Strategy [1]published by the government on 2012 stated that geothermal energy was the great non-conventional renewable energy in Chile, no public agency has walked the talk on this, and the document remained only as a declaration of good intentions (Sohr, 2013).

3.1 The initiatives

Below we present an overview of the main communication initiatives fostered by the different organisms in the country that were related to geothermal development during 2009-2013. All the reviewed organizations are committed to this subject because of their public responsibility (government agencies), the two companies that have led high enthalpy geothermal development during the past five years (Energía Andina and MRP Geotermia Chile, former GGE), the main trade association, which includes a group of companies involved in the industry, plus CEGA's work on this area. Information about each organization was gathered through in depth interviews with the employee chosen by the organizations.

3.1.1 Ministry of Energy

Geographic scope: National.

Target audience: General Public.

On 2011 this ministry released a campaign called "Energy for Chile", which included a series of animated videos about different energy sources (oil, biomass, wind, tidal, nuclear, hydropower, geothermal, gas, coal, and solar) which are still available on line[2] and a website, Facebook and Twitter accounts which are no longer active. The objective of the campaign was to offer a comprehensive global energy scenario and provide background information for the public to generate an informed discussion on energy issues. The campaign did not highlight any energy source in particular, as its main goal was to reinforce the idea that Chile needs a combination of energy sources to meet its internal demands. Regarding hydropower, the campaign stated that Chile had very favorable natural characteristics for the development of this type of energy. Specifically regarding geothermal energy, the video said that it was not widely used worldwide, that it was unexploited in Chile, and that among renewable energies geothermal demanded the highest investment yet it had low impact and constant supply. In response to a formal inquiry on communication activities and products on geothermal energy, the Ministry of Energy declared that it relies on the Renewable Energies Centre (Centro de Energías Renovables, CER) for the dissemination of geothermal energy information.

3.1.2 Renewable Energies Centre (CER)

Geographic scope: Southern regions of Maule and Biobío, northern regions of Arica y Parinacota, and the central Metropolitan Region.

Target audience: public officials, investors.

The center has no massive communication strategies to promote geothermal energy. However, during 2013, in an effort to promote geothermal energy among public officials, CER organized a workshop on geothermal capacity for the public sector. The workshop was held in three regions of Chile where geothermal projects were more advanced. The aim of the workshop was to present the main technical concepts related to geothermal generation to help the public officials who take part in the environmental assessment of geothermal projects. For this initiative, CER worked along with SERNAGEOMIN, researchers and geothermal companies (Energía Andina and MRP Geotermia Chile, described below, were among them).

CER also has generated printed material on renewable energies in general, which includes geothermal energy. There is a quarterly publication called "Antena Tecnológica" (Technological Antenna) that broadcasts the current development stage of different energies, separately. CER also published a box with a thick set of cards about renewable energies and descriptions of the different technologies associated with each one. These are available for visitors at CER's offices (investors, public officials), and are taken to energy fairs when CER is invited to participate with a booth. Some of this information is available on line.

3.1.3Achegeo

Geographic scope: National.

Target audience: geothermal experts, investors, students, mass media.

Promoting geothermal energy is the main goal of this trade association; its communication strategy aims to maintain an updated web site covering the main topics about geothermal energy in Chile —news, legal, historical, and technical information. One of the strengths of this organization is Public Relations and its aim to be present at most of the fairs, seminars, and meetings related to renewable energies either with a stand distributing printed material (about Achegeo itself and geothermal energy in general) or giving talks disseminating the current state of geothermal energy in Chile. Achegeo also has organized two international geothermal energy congresses in Chile, focused on opening an arena to discuss the regulatory framework, legislation, and market development on geothermal energy. On both occasions, Achegeo published a geothermal energy insert in a national circulation newspaper. This organization also has an active presence in social media, but they still have very few followers.

3.1.4 Energía Andina

Geographic scope: northern and central south Chile, national.

Target audience: local communities and authorities, mass media.

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[1] Available in http://www.minenergia.cl/documentos/estudios/2012/national-energy-strategy-2012-2030.html (last visited on 28/05/2013)

[2] Videos available in https://www.youtube.com/user/energiagobchile (last visited on 12/05/2014)

Energía Andina has one exploitation and 18 exploration concessions. So far, it is one of the most active geothermal energy companies in Chile. The company works with two communication perspectives: corporate and a local. Under its corporate strategy, Energía Andina aims to generate general awareness about geothermal energy and make it available for the public. "Because geothermal energy advances at such a low pace in Chile, it gives us time to work on the issue of disseminating geothermal energy information now, when projects are seeding" (Patricia Armingol, personal communication, 27 March 2014). Communication materials at this level include brochures and web information for the public, a series of three comics for children and an interactive web site about to be launched developed by the company in cooperation with Educar Chile, one of the most visited educational web sites in the country. At a local level, Energía Andina's main communication objective is to inform about each of their projects to the corresponding local community, answer questions, and generate dialogue initiatives in order to socially legitimate the projects. Activities under this premise include community talks and involvement of community members in fieldwork such as water monitoring.

3.1.5 MRP Geotermia Chile

Geographic scope: northern and central south Chile, national

Target audience: local communities and authorities, mass media

Formerly named GeoGlobal Energy, the company changed its name in 2013. At this time, they decided to appropriate the word "geothermal" and use it to highlight the concept of geothermal energy in their agenda. Currently, MRP Geotermia Chile has one exploitation and three exploration concessions. In the north, the company encountered hard resistance from the community, who thought they were looking for gold and/or water, a common belief among northern villages where water is scarce and the main economic activity is mining. Similar to Energía Andina, MRP has an officer in charge of community relations. (Energía Andina~~'s~~ has a larger unit for these affairs). MRP began intensive fieldwork to gain community trust. They organized several meetings and offered to be partners with the community in the project if the plant was built. The company's goal was clear: sign a contract with everyone to turn all goodwill manifestations into a formal document. This could only be achieved after stemming the flow of bad information, as many misconceptions about geothermal energy circulated among the communities: from unclear water issues up to assumptions of nuclear waste being carried to the exploration fields (Cristian Sandoval, personal communication, 25 March 2014).

Also, MRP Geotermia Chile has a macro-communication strategy that aims to influence the media, congressmen and relevant ministries to unlock geothermal energy development. The company recently launched a new web page that provides almost as much information about what is geothermal in general than about the company itself. Frequently, MRP Geotermia Chile gets involved in talks and workshops organized for and by these three different audiences. The company built a positive public image when in 2012, after several flow tests, the company broadcast it had one of the most productive wells in South America. It was the first time that a picture of man-made geothermal steam discharge was written with a positive spin in the press after the "El Tatio incident" three years ago.

3.1.6 Andean Geothermal Centre of Excellence (CEGA)

Geographic scope: National.

Target audience: students (primary up to graduate), media, decision makers, adults and local communities near geothermal projects.

CEGA's public outreach objectives are to educate by battling prejudgments and making truthful information available; establishing relationships by creating bonds with different organizations (educational, media, governmental) and maintaining communications. The latter allows enhanced impact monitoring of outreach efforts by developing long-term communication with CEGA's audiences. Within the framework of these objectives, CEGA has developed different materials and activities during its first three years of existence. They include workshops with different target audiences —local indigenous communities, students, tourist associations, legislators, geothermal companies— either with one type of audience or by fostering interaction among them. We provide educational materials, such as videos about geothermal, its uses and common misconceptions about it, brochures and posters. All are available on line. We have interactive stands at national science festivals (+50.000 attendees); summer schools and field trips about geothermal energy for high school students; science cafés and guided laboratory visits for the general public.

CEGA is also present in the internet through a web page with updated general information on its activities and geothermal information in general. We have an active presence in Facebook where we contact a dynamic audience through attractive multimedia products with general information on geothermal energy and use~~s~~. Currently CEGA is developing a book for the non-specialist public on the geology, history and legends associated with some of the most important geothermal features in Chile. Because CEGA aims to reach a wide audience, all products are developed under a creative commons license~~,~~ and are distributed through a data base that includes the media, geothermal energy companies, students, congressman, energy experts, and many others. Many organizations around the world use CEGA's materials for their own outreach activities, which is one of CEGA's goals.

3.1.6 Ministry of Environment, Ministry of National Assets, SERNAGEOMIN

No reported activities and/or materials.

4. CONCLUSIONS

The Andes is one of the world's largest untapped geothermal areas. There have been some initiatives to promote geothermal energy development in Chile, and the largest efforts have been made by private industry. At an outreach level, the same scenario applies. The two companies that, to date, show the most developed geothermal energy projects, Energía Andina and MRP Geotermia Chile, together with the trade association Achegeo, are the organizations that have put together more communication resources for the public when compared with the outreach efforts of state organizations such as *ad hoc* ministries and agencies. The exception is the

public funded research centre CEGA, which has an active outreach program for geothermal energy. However, the very existence of CEGA depended on winning competitive starte funding and the motivation of a research group to apply for the money. It was not the product of a state strategy for geothermal progress, as has occurred in most of the countries where geothermal is now a developed source of energy. Considering that the Ministry of Energy establishes the guidelines for Chilean energy development, and that it has publicly declared its commitment to support the development of geothermal energy – even though concrete actions are still pending-, it should take a leading role in increasing the exposure of geothermal energy, proclaiming it as an abundant, local, clean and competitive energy alternative for Chile.

The most common communication material among all organizations involved in geothermal energy development is the brochure with general information describing this energy source. However, the dissemination of these products is not very effective, as most organizations make ~~it~~ them available to people visiting their institutions, which means it usually doesn't reach an audience not previously interested in this subject. So~~,~~ even though geothermal public information in Chile has increased during the last decade along with the development of the industry (Hodgson, 2013), the~~ir~~ scope is still limited, as most introductory materials are printed materials and their distribution is limited to audiences who belong to a circle interested in geothermal energy: developers, investors, government officials, among others.

Of course, web based information with general data about geothermal energy is a common feature among organizations; however, simple facts such as an updated list of geothermal exploration and exploitation concessions cannot be accessed easily at official institutions in charge of this (Ministry of Energy), not to mention a map with all this information. In addition, the use of other web-based platforms such as social media (Youtube, Facebook, Twitter, etc) has not been deeply explored by most organizations. According to feedback experiences collected by CEGA (mostly via email, social media and personal communication at large science festivals), videos are the most effective tool for disseminating general information about geothermal energy to a broad audience. However, videos, like any communication material, are of little use without a good dissemination strategy. So, social media has played an important role in promoting CEGA's video—and at the same time~~,~~ reaching new audiences not usually seeking geothermal energy information.

Other common activities among most organizations are workshops and seminars. These events are one of the few initiatives where different institutions involved in geothermal promotion interact. Sometimes they organize them together and sometimes members of different organizations invite each other to give presentations or share a discussion table. However most of these talks are aimed at the geothermal community and not at a non-specialized audience. The shortage of other examples in which people work together shows that geothermal energy promotion to communities is not managed well by most organizations. Considering that the geothermal energy "scene" in Chile is so small, and that most people working in it know each other, more effort should be made to boost together social acceptance of geothermal energy in Chile and raise awareness of its huge potential in a country that is undergoing a national debate about its energy future. Regarding this matter, CEGA has set a precedent by offering the use of the center's communication materials to any organization that might need them for their own outreach activities.

Finally, about the content of most products reviewed, there is a tendency to highlight technical information about geothermal energy. However, it might be interesting to consider for future communication strategies that when evaluating unfamiliar technologies, the non-scientific audience deliberates over notions of how it affects their own lives rather than the technical details. Thus the personal values of people or communities override technicalities (Mabon et al., 2013). Moreover, treating information at a technical level is an effective way to remove it from public debate (Callon et al., 2011), the opposite of what geothermal energy needs to gain social acceptance. Thus considering the "El Tatio incident" is such a powerful and permanent memory in the collective consciousness of Chile, information on how all uses of geothermal energy might improve the quality of Chilean~~s~~ lives rather than how a geothermal plant works, could improve the perception of this energy resource.

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