EIA for Transmission Lines in Chile

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Abstract

One of most complex types of projects for the EIA in Chile are the High Voltage Transmission Lines. A first stage of the foregoing paper shows an overview of transmission projects historically submitted to the environmental impact assessment system in Chile, from 1997 to date. This overview considers the type of instrument submitted, region, owners and amounts of investment. A second stage shows a detailed analysis of two projects to exhibit applied assessment procedures. One of them has already been evaluated and is already built, while the second corresponds to a recently evaluated, but not yet started construction. In the discussion is possible to verify the relevance of the particularities of the territory in the environmental impact assessment in Chile.

1. Introduction

Currently 188 energy generation projects for a total of 24,741 MW are under construction or environmental assessment in Chile (Central Energía, 2012). All these projects need to build transmission lines to connect them to consumers centres.

If we understand location as the principal environmental and social aspect of transmission lines projects, the country has two principal territorial problems:

- a) The shape, relative to a continental territory of 4,200 km. long and 180 km. wide, limited by the Pacific Ocean and the Andean mountains.
- b) Generation sources at the extreme sides of the country and consumers in the central area.

Should be noted that, in the last years, the environmental assess of the Transmission Projects has had to many difficulties in deadlines, and conflicts with different actors.

Therefore, it is relevant to know the accumulated experience to the date, using information of assessed projects and reviewing the procedures followed in the completion of related transmission lines projects.

2. Chilean Transmission Line EIA Overview

On April 3, 1997, the "Regulation of environmental impact evaluation system" was published. It mandates the environmental assessment of projects. The regulations established in the Article 3, letter b) state that the following projects must undergo an environmental assessment:

b) High voltage electric transmission lines and his substations.

Means high voltage electric transmission lines those lines carrying electric power with a voltage greater to twenty-three kilovolts (23 kV).

It also means high voltage transmission line substations those related to one or more lines of electricity transmission, and are designed to keep the voltage level of transport.

In this context, as shown in Table 1, a total of 274 transmission line projects have been submitted for EIA in Chile for a total investment of \$ 4,400 million U.S. dollars, which in proportional terms represents some 2% of all projects submitted in Chile. Note that these figures do not consider the project and amounts associated with specific substation projects, because they are not part of the analysis performed in this work.

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Year	Submitted Form				Total	
	EID		EIS		IOLAI	
	Projects	Amount (U.S. Dollars)	Projects	Amount (U.S. Dollars)	Projects	Amount (U.S. Dollars)
1997	2	\$ 4,600,000	5	\$ 164,800,000	7	\$ 169,400,000
1998	16	\$ 42,380,000	4	\$ 47,200,000	20	\$ 89,580,000
1999	7	\$ 46,020,000	3	\$ 11,830,000	10	\$ 57,850,000
2000	9	\$ 63,900,000	3	\$ 31,300,000	12	\$ 95,200,000
2001	8	\$ 47,800,000	4	\$ 32,500,000	12	\$ 80,300,000
2002	15	\$ 23,440,300	3	\$ 49,360,000	18	\$ 72,800,300
2003	17	\$ 32,438,368	-	\$-	17	\$ 32,438,368
2004	10	\$ 66,366,768	2	\$ 18,400,000	12	\$ 84,766,768
2005	14	\$ 41,175,580	-	\$-	14	\$ 41,175,580
2006	16	\$ 297,699,308	3	\$ 140,310,000	19	\$ 438,009,308
2007	21	\$ 281,007,185	-	\$-	21	\$ 281,007,185
2008	23	\$ 734,059,076	5	\$ 148,400,000	28	\$ 882,459,076
2009	20	\$ 165,232,366	1	\$ 13,000,000	21	\$ 178,232,366
2010	24	\$ 380,196,231	5	\$ 316,826,400	29	\$ 697,022,631
2011	27	\$ 247,447,285	7	\$ 958,230,000	34	\$ 1,205,677,285
Total	229	\$ 2,473,762,467	45	\$ 1,932,156,400	274	\$ 4,405,918,867

Table 1: Transmission Line Projects submitted (1997 - 2011) and investment amounts.

Source: Own elaboration from SEA data, 2012.



Figure 1: Transmission Line Projects submitted (1997 - 2011) as assessment level.

Source: Own elaboration from SEA data, 2012.

In Chile, there are two levels of environmental assessment for projects that require EIA, these are called 1) "Environmental Impact Declaration (EID)", that might be associated with an abridged environmental assessment, and 2) "Environmental Impact Study (EIS)" that is associated with a full environmental assessment. Under these level classifications it is possible to observe, as shown in Table 1, that a total of 229 projects have entered the process under the EID level, with 45 projects having entered the process under the EIS level since 1997. Nevertheless, the average invested amount per project for an EID entry is approximately \$ 10 million, while for the EIS it is 40 million (U.S. Dollars). The largest expenses on EIS reflect more budget aimed to them due to the greater complexity of the EIS process. In relation to this information (Figure 1), showing projects submitted during the period under review, 222 have been approved which is equivalent to 81%, for amounts of \$ 2.674 million. 34 projects have been rejected, abandoned, or not admitted representing 12%, and the remaining are still under evaluation. It should be noted, as shown in Figure 1, the trend has been an increasing number of projects submitted for environmental assessment related to energy dynamics that exist in the country.

The submission of transmission line projects according to their region and their invested amounts can be seen in Figure 2, where there are shown from left to right in latitudinal order from north to south, except for inter-regional projects (those that are located in two or more regions). According to the data shown in Figure 2 regarding numbers of projects, there is a tendency for most projects to occur in the northern and center regions, decreasing towards the southern extreme regions. In relation to the amount of investment it is possible to see how it is concentrated in the northern regions of the country and remains stable in the central and south. The trend set by the amount of investment is directly related to mining development which occurs mainly in the northern region of the country.





Note: North to south from the left to right. Inter-regional (more than one region) in extreme right. Source: Own elaboration from SEA data, 2012.

In relationship with the type of project operators, there are significant differences in relation to the number of projects and the invested amounts. Figure 3 shows that companies dedicated specifically to transmission have higher number of projects (75), followed by generation companies (66) and distribution (57). In relation to the invested amounts, Figure 4 shows that mining projects have greater investment for this type of work (38%), followed by transmission companies (33%) and generation (22%). These data reinforce the structure of this business area to its link with mining.

Figure 3: Number of transmission line projects submitted to the SEIA (1997 - 2011) by Owner.







Source: Own elaboration from SEA data, 2012

3. Analysis of two transmission lines projects

Two similar power transmission projects have been selected for analysis. These are works tendered by the state to be part of the trunk transmission system of the country, with similar lengths, and are located in the central region of the country which houses most of the population and therefore fragment the territory further. In Table 2 a comparative overview of these two projects is shown.

One of the main problems in the EIA system of Chile is the absence of legislation in assessing alternatives. This is one of the essences of EIA systems around the world and linear projects such as transmission lines can become very complex in the absence of this tool. In the case of project 1, the absence of this tool means that in a first submission the assessment may be abandoned, due to the location of the track over a significant number of lands belonging to indigenous communities. Later, the track was modified, increasing its length, but significantly decreasing the affected indigenous lands. Later, during the construction, other problems were identified that could have been considered during the EIA and addressed, but resulted in certain track sections being assessed again. In project 2, a connection substation was located adjacent to a national monument and other developments; therefore, the assessment process forced the owner to submit alternative locations for this sector.

4. Conclusions

Since the start of the EIA System in Chile, the number and amounts of investment for transmission lines projects are continuously increasing, in response to the new sources of energy generation and the increment of energy consumption. The cost of the project is a good indicator for the difficult of the assessment, because the greatest investments are assessed throw EIS and the lowest the abridged EIA form.

Most projects are done in the northern and central regions, or are inter-regional. In relation to the amount of investment it is possible to see how this is concentrated in the northern regions of the country or are inter-regional and remains stable in the central and southern regions. This characteristic confirms the strong territorial influence in the transmission lines localization based in the two aspects indicated in the introduction.

Analysis of two projects has shown how at the local level, multifactorial environmental aspects have relation with the territorial problem of the country.

According to the above, a global vision of the country energy problem is needed, considering territorial situations for avoid unnecessary environmental impacts and social conflicts.

Name of	1 Línea de Transmis	ión Charrúa – Nueva	2 Línea Ancoa - Alto Jahuel 2 x 500 kV:		
Owner	Temuco 2 X 220 KV	emición	Primer Circuito		
Owner			Alto Januel Transmisora de Energia		
Main	Length	205 km	Length	255 km	
Features	Voltage	220 kV	Voltage	500 kV	
	Circuits	2	Circuits	1	
	Structures	549	Structures	577	
	Average vain	390 m	Average vain	450 m	
	investment	\$ 65 Million	investment	\$ 130 Million	
Assessment	Income year	2006	Income year	2010	
Process	Duration Assessment	169 days	Duration Assessment	407 days	
	Requests for	1 time	Requests for	2 times	
	Antecedents	1 time	Antecedents	5 times	
	Observ	vations	Observations		
	- First admission was a	bandoned because the	- The project was presented for assessment in		
	track affected a sign	ificant proportion of	a section (+ / - 3km), evaluation of 3		
	- After SEIA approval a	s. nother submission was	alternatives was necessary for the evaluation		
	made, with a modified	section of the track.	- The project is currently under construction		
	- Other minor modifica	tions of the track were	The project is currently under construction.		
	informed by environme	ntal monitoring.			
Кеу	Physical	Asnerts	Physical Aspects		
Environmental					
Issues	- The main concern wa	s noise emissions from	- There was special consideration to the		
			is parallel to other transmission lines.		
	Biotic a	aspects	Biotic aspects		
	- Project considers t	he logging of native	- Project considers the logging of native		
	forests with protected s	species.	forests with protected species.		
	- There is also a Rescu	e and Relocation Plan	- Scare off native wildlife.		
	for Wildlife				
	Human	aspects	Human aspects		
	- Track is located in	areas with indigenous	- Irack is located in rural areas with significant		
	communities.		occupancy of nouses and small properties.		
	Lands	scape	Landscape		
	-Track will be dev	veloped away from	- Track is situated parallel to other		
	attractions and potentia	al observers	transmission lines.		
			The track will have to be adapted to avoid		
			interaction.		

Source: Own elaboration from SEA data, 2012.

5. References

Alto Jahuel Transmisora de Energía (2010). "Línea Ancoa - Alto Jahuel 2 x 500 kV: Primer Circuito", Arcadis Geotecnica, Santiago de Chile.

Central Energía (2012). "Estadísticas de proyectos" en <u>http://www.centralenergia.cl/proyectos/estadisticas-proyectos/</u> reviewed jul-24/2012.

Ministerio Secretaría General de la Presidencia (2001). "Decreto Supremo 95 Reglamento del Sistema de Evaluación de Impacto Ambiental".

Transchile Charrúa Transmisión (2006). "EIA Línea de Transmisión Charrúa – Nueva Temuco 2 x 220 kV " JIA Consultores, Santiago de Chile.

Transchile Charrúa Transmisión (2006). "EIA Línea de Transmisión Charrúa – Nueva Temuco 2 x 220 kV (Segunda Presentación)" JIA Consultores, Santiago de Chile.

Transchile Charrúa Transmisión (2007). "DIA Ajuste de Trazado Vértices V17B PR3 Línea de Transmisión Charrúa Nueva Temuco 2 x 220 kV" JIA Consultores, Santiago de Chile.