



**STRATEGIC ACTORS AND SUSTAINABLE CONSUMPTION
IN LATIN AMERICA AND THE CARIBBEAN (LAC).
CASE STUDIES IN THE MINING SECTOR
Analytical Framework Report**

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STRATEGIC ACTORS AND SUSTAINABLE INDUSTRIAL CONSUMPTION OF ENERGY AND WATER: CASE STUDIES IN LATIN AMERICA’S MINING SECTOR

Analytical Framework Report

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1. Introduction: strategic actors, moving towards a sustainable consumption of energy and water in the mining sector in Latin America and Caribbean (LAC)

In general terms strategic actors of mining sector produce a public discourse more or less favorable to the environment but play a fundamental role in defining public and private policies in the context of development capitalist models oriented to the global market. Nevertheless it is well known that the mining sector is, structurally speaking, one of the less favorable to sustainable production and sustainable consumption of natural resources (especially water and energy). In search is the elucidation of the underlying discourses that can evince the extent to which these actors are beginning to assume (or not) a real pattern shift towards real sustainable consumption in the context of structural, global, local, and strategic constrains and dynamics.

The general objective of this research is to study in comparative terms the social representations of sustainable industrial consumption of energy and water in the mining sector of strategic actors in LAC analyzing selected cases of strategic actors involved in environmental governance paradigmatic cases in Argentina, Chile, Ecuador and El Salvador.

Strategic actors have an agency capacity (Giddens, 1984) that influences structures and are able to affect or decide strategic directions of development processes to “business as usual” or to real changes. This agency capacity will be conditioned however, by the degree of interaction of these actors within the globalized economy and its institutions and the multi level environment governance and sociopolitical scenarios.

We define strategic actors as those privileged people (members of the elite or not) that have the capacity to act or to frame actions to pursue their long term interests through influencing their (social, economic or political) environments. In this case we define strategic actors playing a role around the mining sector as those people with the capacity to act or to frame actions within the strategic decisions making and decisions taking processes over crucial long term problems of industrial consumption of energy and water in the mining sector so actor having a powerful influence in strategic negotiations that define and frame the mining projects.

The strategic actor we are to study play a role in the mining sector but, because the relevance of this sector in the whole society they will assume a public role and in certain moments, because of their privileged social or institutional positions, or their crucial role in make visible particular conflicts, they will have the capability to shape, negotiate and take relevant societal decisions – mainly decisions that impact social, economic, political or environmental future long term paths for the whole society.

These strategic actors could be constituted by elites and non elite's members, directly or indirectly related to the mining industry: people involved in company direction or political high positions or closely related with technological, normative, law and highly controversial issues that can strongly influence the development of industrial (mining) consumption and production patterns. They might include, given the case, members of company direction, CEOs, government officials, members of the parliament, technicians, civil society, ecological or indigenous movement leaders.

The central inquiries of this proposal is located within a normative approach seeking a planetary transition towards sustainable models of development and consumption, approach necessary to overcome the environmental crisis and social inequities in LAC. The central question is how the strategic local and transnational actors (operating in local scenarios) deal with these problems. We are to focus on the study of specific strategic actors involved in water and energy consumption in the LAC mining sector, choosing some empirical cases to test our assumptions.

Our main questions are: Which are the main features of the strategic actor's social representations of sustainable consumption of energy and water in the mining sector? What are the main assumptions and paradigms that structure and hold their discourses? How their discourses refer to public and private institutional policies, practices and social processes and conflicts? Are these strategic actors shifting to sustainable industrial consumption paradigms? How can the answer to this questions yield clues to elaborate renewed public policy, and training and capacity building policies and challenge new forms of environmental governance to ensure a transition towards sustainable development and to enable more sustainable and equitable approaches to natural resource use in LAC?

Its scope is therefore the natural resources use, mainly energy and water challenges, in the mining sector of primary export economies in light of the global environmental crisis (mainly climate change) and how those challenges affect development patterns. In this paper we conceptualize what can be defined as "sustainable industrial consumption patterns¹" of energy and water in such a way to guide empirical research and how they could be detected in the discourses of strategic actors involved in the mining sector. The definition of local and transnational strategic actor and their role in this subject is deepened in theoretical and practical terms.

Mining is a key factor in the economies of LAC because of its rich endowment of mineral resources. For several countries mining is a major economic activity with a significant contribution to exports. In many regions the local economy depends almost exclusively on mining. Notwithstanding mining historically does not seem to have contributed much to employment generation and the establishment of production linkages and it requires more than most others, an adequate management of environmental issues for sustainable development (Buitelaar, 2001).

All minerals (metallic, non-metallic and fuel minerals) play a role in the production of the world's economic goods and services and are, therefore, crucial to every day economic activity and social and economic development.

¹ Within the industrial category we work here with the extractive and mining consumption.

Mineral resources must be discovered before extracting them, which is a costly process. They are fixed in quantity, variable in quality, and often in remote locations. Once extracted, they must be processed, refined and sold to intermediate and end-use markets. Both in the exploration but more in the extraction phases great amount of inputs are needed and mostly energy and water consumption. Mining is one of the main water consumption industries in the modern economy.

In some Latin-American countries the mines are located in remote and unpopulated regions mostly in the Andes Mountains or nearby. In fact a crucial difference in environmental protection in mining in various countries is their geographical location. While in Bolivia, Peru, Ecuador, Colombia, and to some extent Brazil, the largest mines are located in relatively populated areas with strong competition with agriculture and livestock in Argentina and Chile, the deposits in operation are located either in the high mountains or desert areas, often far from populated areas (Lagos & Peters, 2010).

Even in these regions, mining exploration and exploitation give rise to land and water use conflicts and as they demand a great quantity of water inputs often they compete for water resources of local communities and agriculture. Many cases illustrate these challenges, and how they are often addressed –nevertheless without full success– through the Environmental Impact Assessment (EIA) process. Many cases of mining conflicts have been multiplied all over the Latin American continent due to the increase of mining mega-projects and its 'unsustainable' patterns.

2. Consumption patterns in mining sector and strategic actors in LAC.

Usually consumer society² has been associated with market consumption but not with industrial consumption. But household consumption is the market where the industries sell their products and services so industrial consumption is part of the process by which enterprises provides products and services to the whole consumer society. Most of the industrial consumption is to be considered in aggregate terms and from the satisfaction of the needs of great productive projects. The industrial markets are those in which transactions are made of goods and services to be used in the production of different products that are traded or acquired later for a profit through resale. On the contrary consumer markets are those in which transactions are made of goods and services that are purchased by the final consumer units, mainly individuals or households.

² In the global consumer society a new spirit of capitalism emerges focused not on worldly asceticism (Weber, 1977) but in consumerism (Bell, 1978, Bauman, 1999, 2007), so favored by the post-industrial mode of production (Ritzer, 1996; Moulian, 2002) and new technologies of communication and information (ICTs). Moreover, consumerism reifies consumption, making it an end in itself (Bauman, 2007). As stated by Campbell (1998), the issue in contemporary society is not why people consume? But why do people consume the way they do?

In this paper we want to stress the industrial consumption of energy and water by the mining sector as our main research focus. It is well known that the most common approach and terminology for sustainable / unsustainable in the industry is related to production patterns. Notwithstanding to focus on energy and water use in a key main economic sector of the LAC countries we must refer mainly to the industrial consumption in mining because of the massive use of energy and water implied in the mining process.

In terms of extractive and mining practices, it will be important to assume that the industrial consumption of mines functions within the logic of the consumer society although consumerism patterns of individuals and household is a very different phenomenon of what we can call unsustainable consumption (eg over consumption) pattern of the mining industry.

In the XXI Century the mining industry forms part of the technological society. Usually extractive and miners consumptions are uncontroversial because their practices are viewed from the *common sense*. In the “technological somnambulist” (Winner 2008) society, mining technology is viewed – as many other technologies as well- as uncritical practices, no structuring, and unproblematic for its user. Conversely, if the technologies of extractions and mining are assumed to be “life forms” (Winner, 2008), social constructions (Bijker et al., 1987), and mediators (Latour, 2005) the society can be conceived shaped by socio technical patterns (Geels, 2001). For example the common discursive uses of mining technologies are been centered on the gigantism of products and modes of production, and the massiveness use of natural resources, and the centralized configuration of control.

The over consumption, is based on the illusion that natural resources are unlimited, especially mining products, which in turn is attractive to large companies seeking in Latin America new productive sources due to its abundant supply of mineral resources. The over industrial consumption of mining sector is referred to the waste of water, energy and other inputs within inefficient and polluted ways of producing and exporting minerals.

In many countries of the region large transnational investments in mineral extraction for exports are contested by the local population (mainly mega mining projects) because of the social and environmental risks and the fact that these projects exploit and consume large amounts of natural resources without leaving benefits for the country and the local development³.

³ In Argentina in recent years at least a hundred of local communities in 13 provinces are mobilizing against mineral mining megaprojects.

3. Sustainable consumption patterns in mining sector and strategic actors in LAC.

There are various meanings of the concept of *sustainable consumption* (Pujadas et al., 2009) but in general terms they include ethical and responsible dimensions that allow thinking consumer practices as specific technological practices⁴. The ethical issues are more associated with the notion of care and liability issues are more associated with the concept of responsibility.

“Careful consumption” indicates a moderate attitude installed on the users, who are wary of the depletion of nonrenewable resources, and beware of possible consequences. For its part, responsible consumption supposes the identification of the impoutability of the identified impacts and if possible they can be quantified or perceived in terms of specific risks. Someone must answer for the damage of a particular consumption.

In industrial terms sustainable consumption must take in account the fact that industrial production – mining in this case – must consider in all of its productive chain forms of avoiding, mitigating or compensating environmental and social damage.

For the purpose of this paper, *sustainable consumption* is constructed as concept by the notions of careful and responsible consumption and includes other dimensions linked to ecology and social awareness⁵.

Industrial sustainable consumption will be the concept to be applied to mining industries so it must include the discourses related to practical and operative ways through which: a) they optimize processes to be friendly with the environment and humans; b) they optimize the efficiency of water, energy (PRIEN, 2008), or in their best practices (Brantes & Olivares, 2008, UNCTAD, 2011) and other inputs consumption; c) they take all measures to advance in terms of an equitable and environmentally sustainable use of natural and human resources avoiding pollution and ecological damage⁶; d) they realize compensation and repair measures of natural cycles and ecological and social damage caused by the mines.

⁴ The discourse of sustainable consumption includes a dimension of social responsibility and social and environmental ethics (Goulet, 1990). The beginning of the term was coined by the United Nations Commission for Sustainable Development (see CEPAL, 2010). It is important to stress that sustainable consumption goes hand in hand with sustainable production.

⁵ Sustainable Consumption can indeed include at least three dimensions: Ethical Consumption, Green or ecological consumption, and Social or Solidarity consumption.

⁶ We must never ignore the highly problematic issue of contamination by mining activities, especially with regard to water.

Reallocating public and private investments –spurred through appropriate policy reforms and enabling conditions – is needed to build up or enhance natural capital and modes of mining production friendly with the environment. Green investments in the mining industry will enhance new sectors and technologies that will be the main sources of economic development and growth of the future: renewable energy technologies applied to mining, resource and energy efficient buildings and equipment, low-carbon transports systems, infrastructure for fuel efficient and clean energy vehicles, and waste management and recycling facilities. Complementary investments are required in human capital, including greening-related knowledge, management and technical skills to ensure a smooth transition to a more sustainable development pathway.

The UNEP report (2011) indicate that in the short term, economic growth under a green scenario may be less than under business-as-usual. However, in the longer term –2020 and beyond– moving towards a green economy would outperform business-as-usual by both traditional measures (GDP growth) as well as more holistic measures (per capita growth).

With respect to water consumption in mining we must take in account the diverse use of it in different processes. As for the copper mines, for example, these includes water consumption in camps; consumption in the mine; consumption in concentration plants; transportation of ore or concentrate; foundries; electrolyte refineries; and hydrometallurgical processes. The actions to manage in efficient ways the hydro resource involve: monitoring; source management; extraction, transport, storage and distribution; reduction of consumption in transactions; practices; alternative uses and disposal of surplus; technological alternatives for water resources management; technologies to optimize the use of water resources and technologies to increase the available water resources.

In many mining locations of the Latin American continent the deposits are located in areas of difficult excesses. In the exploration, project development, and operation stages water and energy resources becomes a critical and strategic input of viability, besides the influence of particular government regulations⁷, some of them related to controversial mitigations measures facing Climate Change⁸.

In LAC there were efforts, not so institutionalized yet, to reduce the consumption of energy and water in mines. This is the case of Chilean copper mines which could contribute approximately 15% of total saving of energy consumption in the country by the year 2021 (PRIEN, 2008: 135). But still it

⁷ Given the unique characteristics of individual mining projects, it is difficult for general environmental laws and regulations to cover all possible contingencies. As a result, countries seeking to develop their mining industry should have in place an EIA process that establishes project-specific standards to be met and maintained through the life of the project (UNCTAD, 2011: 113).

⁸ Notwithstanding the main energy consumed by the mining industry are electricity, oil and diesel. But the electricity in many countries of the region is produced by coal, gas or oil and not by non conventional renewable energies such as wind, tidal, geothermal, or solar energy.

is possible to make more improvements in the efficiency of processes in the Chilean mining industry, for example, focused on: use of energy efficient devices, cogeneration and vapor recovery, use of waste heat, recycling and reuse materials (*Ibid.*:121), renewal of engines, incorporation of more efficient equipment such as electrical motors, lighting, and concentration and refining processes.

The sustainable pattern of consumption of energy by the mining sector may be implementing technologies and measures to increase the use of renewable sources of energy, and even in the case it will not be the main option the TNC and other local companies might engage in broad compensation plans such as investments in green technologies, renewable energy plants for the rest of the population, or other sustainable measure to repair damage to the environment caused by their productive consumption and productive unsustainable processes.

In sum, we assume in this project that the confrontation of sustainable / unsustainable industrial consumption (patterns) of energy and water as a useful approach to consider discursive practices of strategic actors situated in particular mines, at different scale of production and organizational configuration.

4. Multi level perspective to analyze sustainable patterns of mining industries in LAC

In our study the discursive practices of our mining energy and water consumption pattern could consider a number of factors and respond to a number of questions at three levels of analysis: macro, meso and micro (adapted of Geels, 2011).

4.1 Macro Level

In macro level it is possible to include the discursive emergences in global terms. At this level the transformation expectative and claims have planetary scope, and the contingencies are hanged on historic and complex kinds of long discursive relations, as a landscape metaphor. Meanwhile, industrial consumption is linked with the principles of the consumer capitalist society discourses, demographic explosions tendencies pressing over and over the natural resources of the planet, geopolitics and economic relations in a historical perspective, climate and oil prices crisis, in other words they are linked with large chains of transformations. The expectative of sustainable mining consumption depend on discursive practices centered on progress paradigm, which in general present opportunities and limitations to transitions towards sustainable consumption patterns in meso and micro level.

In the recent decade the transnational companies (TNC) have increased investments in mining in many Latin American countries, and the flow of capital is projected to be continued. The South

American continent is therefore extremely important for the production of minerals⁹ needed by the world (Lagos and Peters, 2010: 2). Exports of minerals and fuels represent a significant proportion of total exports of many South American countries, as shown in below chart.

País (2008)	Exportaciones Mineras (millones de dólares)	Exportaciones Totales (millones de dólares)	% Exportaciones Mineras respecto al total	Exportaciones de Combustibles (millones de dólares)	% Exportaciones Mineras y Combustibles respecto al total.
Argentina	4.923	70.018	7,0	6.720	16,6
Bolivia	1.938	7.058	27,5	3.519	77,3
Brasil	31.759	197.940	16,0	15.200	23,0
Chile	38.185	69.086	55,3	-	55,3
Colombia	7.447	37.626	19,8	12.213	52,3
Ecuador	87	18.510	0,0	11.673	63,1
Perú	18.657	31.529	59,2	2.663	67,6
Venezuela	218 (2)	95.138	0,2	89.638	94,4

Tabla 3: Exportaciones Mineras de países Sudamericanos, 2008, miles de US\$. Fuentes, Banco Interamericano de Desarrollo; USGS; Bancos Centrales; DANE, Colombia; www.investmentmap.org.

It is seen that with the exception of Brazil and Argentina, other countries listed originate more than half of its exports in mineral, metals and oil and other fuels. Exports of oil and hydrocarbons are themselves alone more than 50% of exports from Bolivia, Ecuador and Venezuela. The export of mineral (not oil products and hydrocarbons) accounted for more than 50% of exports of Chile and Peru.

Energy, as energy intensive sectors (such as mining) and exporting economies essential input, has become a particularly attractive for foreign investment. Energy resources as oil, natural gas and abundant water resources of the region attracted the interest of transnational corporations like REPSOL, ENDESA, IBERDROLA and AES GENER, to name a few. Simultaneously, policies on ownership and management of natural resources, including energy, are forming a growing area of political interest and mobilization in social movements and civil society (Larraín & Aedo, 2008).

According to the dominant paradigm that justifies the focus on economic growth most of the governments of the region support the need for developing major energy projects based on conventional energy sources so large mining projects consume enormous amounts of energy from original sources (mainly coal and oil) that indeed increase carbon footprints.

In the context of a progressive international society in transition –albeit slowly– towards green technology, environmental awareness grows. Many studies indicate that growing environmental awareness in public opinion (cf. World Value Survey) and environmental movements are

⁹ South America in 2009 produced 91.9% of niobium in the world, 54.8% lithium, 44.6% copper, 33.5% silver, 23.1% iron ore, 22 , 4% tin and 21.2% of molybdenum (WBMS, 2009).

strengthened¹⁰. As stated some studies have concluded that environmental ideas of strategic actors in Latin America in recent decades have been forged in the context of neoliberal modernization (Hecht, 2005). Recently, however, some businessmen have shown other points of view and, therefore, have initiated a dialogue with the environmental movement (Törey, 2004; Winsemius, Guntram, 2004). In the peripheral developing countries environmental awareness seems to be growing (Parker, 2009a, 2009b), but has not led to the articulation of coherent policies for sustainable development. The connection between business and environmental responsibility that can be seen in European countries (Bravo et al., 2005) is very new in Latin America, except perhaps in the agricultural sector (Brannstrom, 2009).

International obligations can contribute to press changes on unsustainable practices in LAC, such as the sustainable and social responsibility reports that supposedly obey companies to answer international networks in terms of standards of social responsibility, environmental friendly practices and social and environmental justice aspects of their entire process. One example is the persuasive strategies erected from the International of Council of Mining and Metals (ICMM) and its implication whether for to press for changes, or for to preserve *status quo* in extractive consumption patterns.

4.2. Meso level

In meso level it could be possible to find discursive practices crystallized in principles, laws, policies, norms, particular standards. At this level the changing practices could be conceived in international, national or regional scope, for specific periods of time, and the contingencies presented here could be find them on policy negotiations, diplomatic agrees, public controversies, courts, as a particular discursive regimes. Consumerism and sustainable consumption patterns are confronted in traditional markets and public settings, in other words they are linked with regulated and institutional chains of transformations. The expectative of sustainable mining consumption depend on discursive practices centered on normative aspects, normally; discursive practices at the regime are put in question for its contributions or not to sustainable patterns, and could reduce some discursive complexities possible to find at macro and micro level.

After a year of recovery in 2010 the trend has been reverted and, despite some volatile in the markets, during 2011 the mining sector in the Region enjoyed a positive year with a rise in metal prices, increased activity exploration and better access to funding.

It is expected that 2012 will be uncertain for the mining activity characterized by a paradox of high prices for metals but general global economic uncertainty. Prices of metals will remain strong,

¹⁰ In a recent study conducted in 2010 among a representative sample of college students in Chile an absolute majority (96%) state drastic measures to stop the burning of fossil fuels must be taken to confront Climate Change (Parker, 2011).

particularly in the case of gold, what will incentive rather cautious attitude among investors, but in general there will be money available for the mining sector to materialize its investment plans.

Economies which are expected to increase mining activity in the coming years are Brazil, Peru, Argentina, Colombia, Chile and Mexico. There are also several other projects in countries such as Ecuador, Venezuela, Honduras and Dominican Republic.

“In general terms, mining clusters in Latin America compete in commodity markets, on the basis of efficiency in production and low costs. Mining does develop some local agglomeration economies of a static nature, mainly in the form of specialized infrastructure, but develops little dynamic agglomeration economies in terms of learning and innovation capabilities. The financial benefits of the activity accrue more in the metropolis within and outside of Latin America than in the local economies where the resource exploitation takes place. In the mining clusters, a segment of modern firms exists that has little roots in the domestic economy and pursues a strategy of efficiency. They coexist together with a segment of traditional firms that are trapped in a survival strategy. The contribution of mining to local development is therefore perceived as insufficient by the local communities. The development and improvement of local conditions are an issue of secondary importance for the efficiency of big mining firms. This situation does not allow a virtuous circle to occur that produces development”. (Buitelaar, 2001: 16.)

Regarding the conditions for future mining projects considerations of environmental variables are present, but socio-political risks of the investments are much more relevant in the decision making of the great mining executives.

Government environmental regulations try to influence the choices and strategic actions of large TNC but environmental laws of many Latin American countries are backward, inadequate, or its rules are not efficiently monitored and enforced. This means that many foreign mining companies do not find the local regulations particularly burdensome. Many senior mining TNCs already have their own environmental standards and procedures, making it feasible for them to meet the requirements under local legislation (UNCTAD, 2011).

“Aside from maximizing economic benefits from FDI in mining, governments seek to minimize negative aspects, including adverse environmental impacts. These include the dumping and accumulation of waste, water and air pollution, deforestation, and acid mine drainage. Mine closure and restoration of the land is another important environmental issue. Though mining activities have traditionally taken place underground, open-cut operations, which often have a larger environmental footprint, have become more prevalent. Governments seek to minimize these environmental costs through increased monitoring and regulation, including the use of environmental impact assessments (EIAs). Over the past thirty years, greater environmental protection requirements have significantly changed the industry. The large footprint of mining projects may also result in adverse social impacts,

which governments seek to mitigate. These issues most often concern land use conflicts with local and indigenous communities, including the effects of mining activities on economic livelihoods and traditional lifestyles” (UNCTAD, 2011: 24).

In response to this lack of legislation in Latin-American, international rights movements are working on denouncing TNCs practices in underdevelopment countries above human rights frame. One example could be the new Organisation for Economic Co-operation and Development OECD guidelines to protect human rights and social development. Also movement of business ethics enrolls different voluntary accordance in terms of Green Miner and Social responsibility. Interesting here will be the ways in which the actors of this networks frame the discursive practices towards a sustainable or unsustainable industrial consumption pattern and can participate directly or indirectly in strategic negotiations in favor of sustainability within the regime level.

4.3. Micro level

At this ground it could be possible to situate discursive practices referred to communities, majors, officials, entrepreneurs, communal leaders, personal relationships, specific projects, processes, and particular realities of consumption, which have some difficulty to generalize. Initially at the micro level the geographical scope of changes is local, for negotiated periods of time, and the contingencies presented here could be translated in innovations, conflicts, communal advocacy coalitions discourses, in niche sustainable and unsustainable consumption discursive practices. Here, consumerism and sustainable mining consumption patterns are confronted with residential consumer preferences, worries, and resistance in front of massive or large chains of consumption. Normally communal consumption patterns are streamlined by polemic rhetoric in favor of preservation particular cultures or specific forms of life. In other way, a successful local miner project could be protected by localities that not precisely obey sustainable principles. Also rhetoric could include notions of risks and opportunities of innovations, new jobs, new plans, techniques and programs. The expectative of sustainable mining consumption depend on discursive practices focused on particular processes, persons, artifacts, impacts, and so on. Micro level discursive practices find links in macro level discourses to press for changes at meso level discourses.

“The environmental impacts of extraction projects depends on the type of mineral extracted, the techniques used and the size and location of the project, all of which are in partly determined by the strategies and activities of the TNC. The potential impact of a mine or field oil on the environment of the surrounding area and beyond is proportional to its size. This impact varies depending on the geological structure and mining techniques. (CNUCD, 2007: 99).

In addition, the risks increase when work extraction is carried out near other economic

activities such as agriculture and fishing, especially if the water quality is threatened. Many mineral deposits are located in protected areas (usually forests protected), which serve to regulate the flow water, prevent floods, fight against soil erosion, protect against intrusion sea water, maintain soil fertility and protect the surrounding ecosystem¹¹. The exploitation of these deposits, if not properly managed, can have disastrous effects on the environment”. (CNUCD, 2007: 99)

Finally we must regard the last phase of the industrial mining process: the mine closure which is also known as mining environmental liabilities (Yupari, 2002). It is known that mining has led to various types of environmental liabilities over the mining places of Latin American countries causing pollution of natural resources and the landscape and indirectly restricting the right of local communities to natural resource use without running the risk of affecting their health and their different development options.

“Once the deposits are exhausted, the mine and its surroundings should be restored to their earlier state. It was once common to leave the site abandoned (Peck, 2005), which can lead to various environmental problems such as acid mine drainage, pollution of surface water and groundwater, soil contamination, landslides caused by the collapse of the deposit of waste or residue [...] Today, most large TNCs have made significant progress with regard to the rehabilitation of mine sites after closure, and it is mainly artisanal miners and small businesses that cause problems in developing countries”.(CNUCD, 2007: 99)

Facing this challenge a notable limitation in Latin American’s environmental framework is the absence of a comprehensive framework for mine closure¹².

Weak regulations and legislations, or the existence of possible corruption or clientelism in Latin-Americans mining networks nurture the visibility of local conflicts. TNCs responding local demands of change their consumerism patterns of mining (especially in words of leaders of grassroots mobilizations) the companies are been obligated to invest on communicative strategies with communities. Here the use of social networks, blogs, recognized communicative consultants, marketing campaigns, between others, become crucial to construct a miner friendly identity in front of the host communities.

¹¹ Technologies that allow the exploitation of deposits are highly polluting and destructive. Mining demands huge amounts of water, and permanently polluting chemicals such as cyanide. Acid drainage and other forms of pollution are sometimes proven effects that start after the company withdrew and closed the mine. On average, 0.51% extracts copper from the rock and 0.0001% for gold. For each ounce of gold produced, it generates an average of 79 tons of waste (Moore, 2011).

¹² The Chilean example is illustrative: while legislation was introduced in developed countries in the 1980s, the formulation of such a law in Chile began only in 1999, and it has yet to be enacted. The Mining Safety Regulations established in 2004 make closure plans mandatory. However, there is not yet any systematic legislation governing all aspects of closure plans, including regulatory, environmental, technical and financial issues (UNCTAD, 2011: 93).

5. Strategic actors and the extractive sector.

The most important actors in the mining industry in LAC are TNC (transnational corporations) and national governments. Yet one must admit the high degree of heterogeneity in Latin American mining industry. Together with the modern segment of TNC, with big investments and technological innovation, a relatively large number of small local firms exist that provide basic services and inputs and are a source of employment for the local population in the lower segments of income. (Buitelaar, 2001: 15).

On the other hand we must make the distinction between the exploration and extraction phases of mineral investment. There are two different types of mining companies involved in this division of labor: “junior” and “senior” firms are often transnational and engage in significant FDI. Many “juniors” small high-technology firms are involved primarily in exploration activities and engage in risky investments. Senior firms have significant economies of scale, technical expertise and access to finance, all of which provide them with a comparative advantage in mine construction and mineral production, processing and refining (UNCTAD, 2011: 15-16)

In general terms the strategic actors of the mining sector are constantly exposed to environmental challenges. In fact,

“Extractive activities, regardless of who performs them, entail costs for the environment. The extraction of minerals metal is a much polluted activity, and the extraction of oil is also linked to various risks for the environment. Because some negative impact on the environment is inevitable, the question that arises is to what extent the activity of TNC helps to mitigate or aggravate them”(CNUCED, 2007: 98).

That is the reason why the high executives of the great TNC or local mining companies are always confronted to make choices with regard to the use of advanced environmentally friendly techniques and technologies or the implementation of more strict norms for environment administration and sustainable consumption of energy and water resources.

Within these challenges, different kinds of socio technical niches have to be changed for a transition to more sustainable patterns. Strategic actors can be conceived such as “grammars in actions” that influence and control the expectations, learning processes and institutional changes in a socio technical regime, where the changes are stabilized in norms, laws, institutions, and finally form part of the landscape or common sense (Geels, 2001).

Moreover this strategic actors are located in centers of calculations (Law, 1992), which human and non human are been interrelated in a “seamless web” (Hughes, 1986). One of the examples of these heterogeneous networks in which the strategic actors are located can be: new models of electric motors for mines, electric transformers, protocols in energy efficiency for miner layouts,

energy efficiency Standards' (ISO 50001), carbon footprints assessments, systems for isolation, Clean Development Mechanisms, and so on. These networks act as an "obligatory pass points" capable to connect executive directors of companies, policy agency for energy efficiency, industrial and economic ministries, grassroots groups, etc.

In face of great mining investments (for exploration or exploitation), as we have said, the great companies have to handle local situations. The usual scenario is that, even though EIA compels to consult local population, the protest of local communities and ecologists is often the response of people to highly perceived risky activities for health, the environment and the local development. Despite the willingness of companies to consult stakeholders, governments still have a role to play, particularly when it comes to protecting the land and resource rights of indigenous peoples and local communities affected by great mining projects.

Although there are good reasons to focus our study of strategic actors on corporate decision-takers and public policy-makers, we must acknowledge the possible (event decisive) role of non-governmental / civil society actors as we have mentioned, especially in the processes of framing the decision making in key issues. In some cases of contestation or conflict they can be(come) strategic actors too. In addition, it can be useful to compare the discourses of the main strategic actors to the local leader's discourses.

But often the same government is the relevant actor that willing to improve labor supply, investments and economic growth enhance and promote FDI of mining TNC even in natural protected areas generating the protest of local population and national and international NGOs (CNUCED, 2007: 99).

5.1. Strategic actors in mining sector and strategic decisions

For this paper we are speaking of strategic actors and not of elites that is the most common concept employed in the analyses of development studies.

Indeed we must recognize that the concepts of elites and strategic actors have differences and similarities. In the literature, the term *elite* is used in many different ways, and often without actually defining the term (Woods 1998). In the context of Latin America, however, elites are mostly used either about the upper classes or as business and political elites. Thus, "elites" has a strongly structural connotation and significant shares of the literature on elites take a rather structural approach, looking at how elites emerge from their positions in capitalist structures. However, there is also a long tradition for studying institutional elites, such as parliamentarians, military elites, political party elites, etc. (Lipset and Solari 1967, Alcántara, 1995).

The term "strategic actor" has different origins, but generally it is used as a means to overcome the classic dilemma of structure and agency: those actors are constituted through the structures in which they operate, but their actions in turn produce and reproduce structures (Giddens, 1984). In the system modeling language, actors are viewed as strategic in the sense that they are concerned about

opportunities and vulnerabilities, and seek rearrangement of their environments that would better serve their interests by restructuring intentional relationships. Strategic actors are thus acting to pursue their long term interests through influencing their environments. In social studies, such actors may be social movements (Hensmans 2003), institutions (Whitley 2008).

In AFP for WP3 we have proposed a multidimensional, dynamic and relational concept of elites as groups that control specific resources by means of which they acquire political power and material advantage (Pina-Cabral, 2000, p. 2), and may control the distribution of these resources in their locale (Marcus, 1998). These resources are economic; ownership to means of production, property, money, as well as control over natural resources, but also political; consisting of the people and organizations that they control politically, social; for example through different kinds of networks, including family ties, and discursive; including expertise and media control.

This is partly a structural concept of elites as it defines elites as situated in different structures of resource distribution; it is not how they use those resources to gain political and economic privilege that define them as elites, it is rather their capacity to do so. Thus, a focus on elites also means a focus on structural inequalities in access to power and resources.

This differs significantly from the concept of strategic actors we are to employ in this WP4 which is focused on actual actions. Structural inequalities may exist in their environments, but the concept tells us nothing about what position in such structures the strategic actors occupy.

Our concept of strategic actors puts the accent in the fact that we are speaking of social actors (in our study, individuals but in their social role¹³) that take decisions that influence the course of actions in the long term of the entire society.

Actors playing a role in the public scene (not a private or face to face role) that have, in certain moments, because of their privileged social or institutional positions, the chance to make and take relevant societal decisions –mainly decisions that impact social, economic, political or environmental future long term developments of the whole society. Generally but not exclusively these strategic actors (acting circumstantially) are members of the elites (in structural terms) but what is important for our study of mining strategic actors is not their elitist position but rather their institutional and conjunctural positions that permits them be in the correct place in order to take strategic decisions.

The usefulness of the concept of strategic actors in the study of influential groups is that one is not bound to think “a-priori” in terms of class divisions, ruling elites or elites dominating particular institutions. Strategic actors can in principle be anyone, and they are accorded a degree of agency independent of their institutional attachment.

¹³ Individuals generally involved with visible macro societal institutions and interactions (business, politics, Medias, science, education, churches, culture, etc.) and not in their private, family, local or community role and interactions.

Indeed, a main motive for Giddens to introduce a focus on strategic action was what he considered the predominantly one-sided focus on homogenizing ‘institutional analysis’, to lead to the relative neglect of the ‘analysis of the strategic conduct’ (Giddens 1984: 373).

Yet, the study of strategic actors that focus on the actual decisions made by influential groups in order to shape structures and institutions, that is the intention of this WP4 proposal, might perfectly be complementary to the study of elites that takes as a starting point the existing structures and institutions (goal of WP3).

The actors are strategic in relation to our object of study when they have direct influence on strategic decision making in mining: when such an impact on investment decisions for new mineral exploration, or to initiate mineral mining operations when explored, or to reinvest in the mine and its processes, eg. convert industrial engines, new technologies more efficient and less polluting when deciding on how to operate the water and energy use in mining operations that involve high-cost options; or when decisions are made concerning the closure of the mine and its environmental liabilities; or when making decisions to mitigate and / or environmental remediation projects, or when it is decided to establish some regulations or laws or modify environmental rules governing mining, or establishing conditions for investment (loans, taxes, royalties, benefits, subsidies, etc.) in mining.

This WP4 will analyze decision-making processes of strategic actors, but from an operational standpoint. Not only arguments will be analyzed, but interpretative frameworks (paradigms inscribed in the actor’s discourses) and what is methodological relevant we will try to contrast discourse with institutional practices. So another object under study will be the corresponding institutional arrangements and facts in the mines under study in each case related to its current industrial consumption pattern of energy and water.

We distinguish key factors –from a pragmatic point of view– that affect the decisions of strategic partners: a) the substantive factors influencing decisions investment in the mining industry, b) sociological reference that frame and influence the strategic decisions affecting the environment.

In relation to the first factor on the basis of studies it is possible to break down certain determinants of the decisions in mining, geological data, availability of infrastructure (including water and energy resources) and skilled labour, political stability and quality of governance, legislation and policy, or security of mining concessions titles; level of taxation, and Environmental and social Regulatory Obligations, and so on.

Regarding the latter study’s findings multi level perspective will be useful to situate the discursive practices in particular and structural levels (micro, meso, macro), that can incorporate tensions as North and South, structural condition of peripheral countries, ideological considerations, which had been proved stronger predictor to environmental regulation than using causal model of data from model to sociodemographic variables preferently (Samdahl, 1989).

5.2 Strategic actors and their perspectives of sustainable consumption of water and energy in mining development

LACs policies focused on energy and water efficiency and savings depend on national budget. This situation has important restrictions for its continuity, due to availability of resources situated on some government interests. In sum this dependence requires new efforts to consolidate these policies on public terms, and during a longer time perspective. For example, while international agencies highlighted Chilean energy efficiency policies on 2009 within the region (Cepal, 2009: 10), today Chilean efficiency budget is claimed for its reduction by aprox. 13% for 2012 in comparison to 2011, what represents a new institutional framework for the sector.

Thus, the actors considered as a focus to reduce energy consumption are situated on residential and policy sectors (i.e experiences in educational policies, policies of reconversion of bulb lighting, isolation and renewable energy in residential homes and public buildings in Brazil, Salvador, Chili, Peru, Uruguay) neglecting the role of energy intensive industries, particularly extractive and miners ones. And we must remember that extractive and mining companies occupy not a negligible share in total energy consumption.

This oblivion appears as a contradiction in lights of sustainable aims for the region. Indeed LACs mining companies are representative of those actors that hamper the transition strategy of sustainable consumption patterns, thereby preserving energy consumption patterns.

Some of the industrial sustainable consumption patterns should be compatible with energy-smart models, ie, distributed design, flexible in design, capable of exploiting indigenous energy resources, reducing transport chains wide, and carbon footprints water, respectively. All with the goal of reducing imports of energy balances of the countries. Here efficiency and saving policy are crucial too.

Also, mining and quarrying have undertaken major programs of corporate social responsibility (AVINA, 2011), in order to reduce the degree of conflict with neighboring communities. These programs are part of an ethical stance, while interested in reducing the social hostility in the vicinity of their sites.

Now, under the concept of responsible mining also small and medium mining has shown in LACs the importance of considering the time range of their exploitation, as well as the need for cleaning projects of their sites. The nature of this type of mining, generally, more rooted in local cultures coal, oil, etc. is usually of local ownership, which could include aspects of sustainable consumption in economic terms any more than possible to find in the mining and large-scale transnational. Normally this kind of exploitation have not got financial resources necessary for efficiency programs, saving, and social responsibility.

Everything that has been conceptualized above is relevant in a governance platform for sustainable development and therefore requires a new vision that aims at sustainable consumption of water and energy in mining arising from a performative speech guiding to a clear political will. Strategic

actors have a key role in the construction of this discourse given their capacity for agency and hence impact on the structural dynamics¹⁴.

A trend that can be observed is that businessmen and even politicians prioritize short-term decisions (three or five years) because of economic and political short-term returns and therefore do not consider environmental issues that are related to options of projects and investments which sustainability pays off in the long term (30 or 50 years). For example with regard to measures of mitigation of climate change time-lags are an important consequence of climate change inertia. As stated by the UNDP report of 2008:

“The cumulative nature of the climate change has wide-ranging implications. Perhaps the most important is that carbon cycles do not follow political cycles. The current generation of political leaders cannot solve the climate change problem alone because a sustainable emissions pathway has to be followed over decades, not years. However, it has the power either to prise open the window of opportunity for future generations or to close that window” (UNDP, 2008: 4).

With 90's democratic processes and in the first decade of this century new policies aimed at improving social equity have been implemented. While the contradictions of national processes are different in the LAC countries, the neoliberal orientation toward the use and management of natural resources and especially energy and water seem to have developed on the basis of unsustainable consumption patterns and have given rise to a series of sociopolitical conflicts in each country where citizens and environmental movements have been protesting and demanding state control of water resources and a more clear regulatory policy in the energy sector. Notwithstanding international market environmental regulations (European Community, NAFTA, WTO etc.) are pressing for environmental impact evaluation and have been conditioning environmental considerations in decision taking in business and government in all these LAC countries.

In this context, the tendency of the discourse of strategic actors seems to be to subordinate the goal of carbon footprint reduction to economic growth, which contrasts with the increased awareness of the problem that exists in the general population¹⁵. WP4 must explore if this tendency is present within strategic actors in Argentina, Chile, Ecuador and El Salvador. As for water use improvements has been made in relation to norms and regulation but not enough in terms of equitable access and to increase sustainability in its management and consumption.

In the context of a progressive international society in transition - albeit slowly - towards green technology, environmental awareness grows. Many studies indicate that growing environmental

¹⁴ Strategic ruling actors are certainly not the only actors in social and environmental change. Civil society actors and social and environmental movements and other stakeholders can also be considered involved actors.

¹⁵ For the Chilean case see Parker 2011.

awareness in public opinion (cf. World Value Survey) and environmental movements are strengthened¹⁶.

As stated some studies have concluded that environmental ideas of strategic actors in Latin America in recent decades have been forged in the context of neoliberal modernization (Hecht, 2005). Recently, however, some businessmen have shown other points of view and, therefore, have initiated a dialogue with the environmental movement (Torey, 2004; Winsemius, Guntram, 2004). In the peripheral developing countries environmental awareness seems to be growing (Parker, 2009a, 2009b), but has not led to the articulation of coherent policies for sustainable development.

6. Analysis of discourse and analysis of institutional practices: strategic actors and their environmental commitment challenge to environment governance in mining sector.

The stakeholder analysis in terms of their strategic decision-making processes can be done only in terms of two key indicators: a) the speeches that expose arguments and motivations that underpin the decisions and b) the final institutional options are the practical results decisions taken by these actors. In this WP4 proposal we mean to analyze both indicators but accentuating the empirical study analyzing the discourse of the strategic actors a key factor that has not been studied in deep up to now.

Sustainable development needs to be considered in ecological, social, political and cultural terms. Cultural models (involving consumption patterns) are in the background of decision taking. It is possible to determine the existence of a set of cultural models that are holding the discourses of nature, the environment, development and sustainability (Parker, 1995).

The analysis seeks to understand the extent to which strategic actors' discourses reflect a transition from unsustainable patterns towards sustainable industrial patterns of energy and water consumption in the mining sector. Discourse analysis must take into account factors of linguistics, semantics, narrative, rhetoric, pragmatic considerations and cultural anthropological, psychological and sociological (van Dijk, 2008).

Given the general awareness about environmental issues the main approach will consider the dual emergence of meaning in discourse structure. An in deep analyze will permit us to evince the social contradictions between an environmental friendly rhetoric and a not sustainable pattern of

¹⁶ In a recent study conducted in 2010 among a representative sample of college students in Chile an absolute majority (96%) state drastic measures to stop the burning of fossil fuels must be taken to confront Climate Change (Parker, 2011).

consumption orientation. Given the polemic about the strategies of externalities or non-market aspects this study incorporates market rhetoric and conventional and alternative practices for natural resource consumption. Moreover, this study will take in account the issues of scientific uncertainty about the impacts and the ability to predict in terms of policymaking.

Our study will not focus on direct forms of discursive interaction but in discourses that have a dual role: they are prepared to confirm identities in a context of interaction (in this case relating to alternative and competing of institutional investment and development mining), but also they order a specific institutional practice (they perform specific industrial consumption practices).

The discourse analyze will be confronted to a secondary sources analyze in order to establish institutional practices and arrangements with respect to energy and water consumption in the mining cases under study.

7. Research Proposal

This research will focus on the role of strategic actors in the mining sector, taking into consideration their social representations as frameworks of their decision making and decision taking related to “sustainable industrial consumption patterns” of energy and water in the mining sector. The study will be centered on case studies where environmental challenges have arisen in specific mining projects where energy and water consumption are relevant and in some of them where local conflicts have arisen between mining companies and the local population (cases in Argentina, Chile, Ecuador and El Salvador).

Given our subject under study a group of strategic actors in Argentina, Chile, Ecuador, and El Salvador mainly businessmen¹⁷, national or local politicians, experts on energy and environment, and local civil society and environmentalist leaders will be selected as units of analysis. The specific sample will be constructed of people involved in each case study.

All of the actors must be involved in present or recent past positions where strategic decisions were taken or are about to be taken around specific mining projects coming from the private or public sector. This means that they must be selected because they are, at the moment of the inquiry, in an institutional position that gives them the power to decide or to strongly influence strategic decisions.

They will be inquired about their vision on energy and water sustainable industrial consumption in general and in the mining sector, including their perspectives of public policy, long terms projects and investments, and environmental governance.

¹⁷ Mainly National relevant Businessmen or Executive Director, member of the Board of Directors or Chief Executive Officer (CEO) of TNC or great Mining firms operating in the country.

Countries selected for the study will be Argentina, Chile, Ecuador and El Salvador (see Comparative data in Annex). These countries are selected because they show different development realities (although they face similar problems in the mining industry within their respective model of development) and different mining industries degree of development. Being Chile the most relevant (mineral) mining country on one side with 43% of the value added percentage of the DGP (industry and mining) and on the other side Ecuador with 26% industry and mining value added of DGP (WB data for 2009). The mining sector in Chile is mostly mineral mining and in Ecuador hydrocarbon are most relevant but with recent policies for opening to mining minerals FDI. Argentina and El Salvador are in a middle and mixed position. All of these countries present a flourishing mining industry where great amount of FDI are expected to grow in the years to come¹⁸.

7.1 Case Studies

The cases in each country will be selected following criteria of relevance of the projects in each region and they must be easily to reach and study with available existing data. All the selected cases are of the same general subclass (George and Bennett, 2005) that make them apt to employ the comparative method. Following the goals of this proposal the selected cases must be great mines in exploration and exploitation phases; with EIA done or in process, great companies where TNC interests, or great national investments are to be present or might be big state owned or mixed companies; energy and water intensive consumption; and enterprises that have environmental programs or have the intention to develop them. The ideal selection would be to have some cases of firms that have initiatives to change the water and energy consumption pattern in order to compare them with those that have not begun those paths. Particular cases indented to be selected:

7.1.1 Argentina: CERRO VANGUARDIA, gold and silver mine, owned by AngloGold Ashanti Limited, Fomento Minero de Santa Cruz s.e. - Fomicruz s.e. , Cerro Vanguardia s.a.

The property consists of 514 km² located northwest of Puerto San Julian in Santa Cruz province, Argentina. The gold and silver mineralization occurs within a range of about 150 to 200 m in a series of narrow veins, banded quartz occupy structures within the Chon Aike ignimbrites. The operations consist of small open pits with high stripping ratios. The bodies comprise a series of hydrothermal vein deposits containing vast amounts of silver, which is produced as a by-product. In June 2006, production for the first two quarters totaled 3,769,396 g of gold at a cost of production of \$ 6.04 / g.

The mine managed certification of compliance of the International Cyanide Management Code, which was awarded by the International Cyanide Management (IMCI). With this certification, it is found that the presence of cyanide in the tailings dam decreased to one third of the maximum

¹⁸ The portfolio of projects planned in Latin America includes an investment of around U.S. \$ 236,000 million for the next 5 to 10 years only in development, and the region remains the main destination for mineral exploration expenses.

allowed, and the application of security and control processes in addition to those regulated, is ensuring practices much more friendly to the environment.

Certifications: ISO 9001 / 2008 for laboratory and foundry; ISO 14001 / 2004 on environmental management and OHSAS 18001 / 2007 Occupational health and safety

7.1.2 Chile: ANGLO AMERICAN, a British company, with its subsidiaries, joint ventures and associates is a global leader in the sectors of mining and natural resources. The company is the third largest copper producer in Chile. Its operations entails five divisions in the north and south of the country: Los Borncos, El Soldado, Manto Verde, Mantos Blancos and Chagres. It has 44% interest in Compañías Minera Doña Ines de Collahuasi (Tarapacá Region), sharing ownership with Zstratapl (44%) and a Japanese consortium.

The total output in 2009 was 669,814 tones of copper which accounted to 12.36% of the total volume of domestic copper export.

Anglo American is one of the largest mining companies in Chile and a major producer of copper. It has been operating in Chile since 1980.

The firm is to say committed to “making business profitability compatible with the highest global sustainable development standards”.

The firm issues a Sustainable and Financial Development Report that includes data of environmental management, energy efficiency program, environmental performance indicators and closure plans.

Currently the company has a legal conflict with the state owned CODELCO because of the sale of 24.5% of Anglo American Sur a subsidiary of the company to Mitsubishi.

7.1.3 Ecuador: The Company AURELIA ECUADOR SA will exploit gold after government approval.

After several years of suspension of the authorization for operating large mining companies, by the Mining Mandate, the Ecuadorian government and the authorities have turned to legislate to allow foreign investment in this sector. This legislation will submit these projects to high environmental standards.

The company Aurelian Ecuador, a subsidiary of Canadian company Kinross, is operating mining in the area of Zamora Chinchipe. The company will deliver \$ 40 million in royalties to the State for the operation and in anticipation of the contract.

Kinross Corporation, the third largest gold producer in North America, acquired Aurelian Resources and its Fruta del Norte project (FDN) or "golden dinosaur" of 13.7 million ounces of gold and 22.4 million ounces of silver in 2008.

It is estimated that the Ecuadorian government's negotiations with Kinross, will define the country's mining future. This authorization comes within broad protests from local communities who have been demanding that mining does not help to overcome poverty and is harmful to the

environment.

7.1.4 El Salvador: EL DORADO, a Pacific Rim project in El Salvador, is gold and silver mine at the South Minita deposit in the Department of Cabañas.

This project is developing within a growing resistance to mining in El Salvador.

The Pacific Rim company is a Canada-based transnational that received a permit in 2002 to begin exploratory work on a massive gold mine in the north-central department of Cabañas. The mine is located in the basin of the country's largest river, the Lempa, which is one of the few remaining uncontaminated water sources in El Salvador, supplying nearly half the country,

8. Objectives

The main objectives of WP4 within ENGOV project are:

General Objective:

To study in comparative terms the social representations of sustainable industrial consumption of energy and water in the mining sector of strategic actors in LAC analyzing selected cases of strategic actors involved in environmental governance paradigmatic cases in Argentina, Chile, Ecuador and El Salvador.

Specific objectives:

1. To elaborate an *overview and fully analytical description of the social representations of the strategic actors* (primarily businessmen, politicians, civil society leaders) on sustainable industrial consumption of energy and water related to the mining industry in-exemplary cases in Argentine, Chile, Ecuador and El Salvador.

This overview will make a description in semantic and analytical terms, of the main discursive contents, at the three levels of analysis proposed while stressing the second level: i. *Macro*: overview of social representations and strategic choices at global and national level involved in public policy related to environmental governance and sustainability in the use of energy and water resources within the mining sector that constitute the paradigmatic framework of the interactions and decision processes of the strategic actors of the selected cases; ii. *Meso*: overview of social representations of strategic actors who are producers and consumers of energy and water directly involved within the local selected cases; iii. *Micro*: overview of social representations of local actors and stakeholders on sustainable consumption of energy and water involved in the selected cases.

2. To achieve the establishment of *comparative typologies* (inter-national and multilevel) of discourses on sustainable industrial consumption of energy and water related to the mining sector based on discourse analysis of the main strategic actors under study.

3. To characterize and analytically describe the main *institutional environmental practices* (mainly sustainable industrial consumption of water and energy of mines) of institutions of the selected strategic actors.
4. To identify *best practices* in efficient and sustainable management and consumption of energy and water in mining sector in order to support the formulation of environmental policies and strategies to enrich better environmental governance in LAC.
5. To identify gaps in environmental education of strategic actors and *to propose communication and educative actions that encourages sustainable consumption patterns* of energy and water in the mining sector.

Methodological goals:

To establish an *analytical pattern* in order to make distinctions and assessments in a comparative perspective at inter-national level (macro level) and regional (meso level) and local levels (micro level) on industrial sustainable consumption patterns of energy and water in the mining sector of institutional actors (in business and the political field) based on the selected case studies.

To contribute to the construction of an *operational concept of sustainable industrial consumption of energy and water in mining industry* valid to be generalized to LAC.

To collect and update data of *accumulated knowledge* in the literature about energy and water consumption in the mining sector and environmental opinions of strategic actors involved in this sector in LAC.

9. Methodology.

The methodological design of the empirical research to be done in Argentina, Chile, Ecuador and El Salvador, will include a general qualitative oriented approach, various case studies and the use of the comparative method.

These countries were chosen to be typologically contrasted with different degrees of mining development but all of them confronted to the challenge of the global market increase of the minerals demand, so compelled to broaden their investments in the mining sector, within economies which growing impulse will increase general water and energy consumption stressing the specific mining sector water and energy consumption.

Although they all undergo through specific changes and situations in politics, economy and environment, the comparative perspective must consider them taking into account in their specific contexts.

The main methodological steps, within the analytical background developed in above pages, are: a) Review of the literature and relevant secondary sources (in process); b) Identification and study of selected relevant cases (in process); c) Distinction and selection of a sample of significant strategic

actors within those selected cases; d) Collection of discourses based on primary or secondary sources of selected actors: employing in deep interviews and available secondary information and sources; e) Analysis of the discourses of the relevant actors under study; f) Collection and analyze of secondary information about institutional practices, mainly industrial water and energy consumption practices, within the social dynamics, including public policy and corporate policy, and environmental conflicts, related to the cases under study; g) General analysis, interpretation and conclusions.

Operationally, we establish that the discourses to be analyzed, those speeches pronounced by the selected strategic actors may not necessarily be identified with the personal speech of interviewed but they can and must be considered as representatives of groups or collective actors (entrepreneurs or political body) involved in each case study. These discourses might be collected in a series of publications.

We will verify and valid the research processes by a triangulation method so multiple instruments and methods for data collection will be employed using a variety of sources including the fieldwork. On the basis of a qualitative global approach the discourse analysis, the descriptive analysis, the process and conjunctural analysis, case studies and other techniques will be employed enabling the triangulation as a mean of validation. These methods and techniques must be developed in due course.

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