Latin America Goes Electric: The Growing Social Challenges of Hydroelectric Development

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Latin America Goes Electric

By Pablo Varas, Manuel Tironi, Hugh Rudnick, and Nicolás Rodríguez

HYDROELECTRICITY WAS, FOR MANY YEARS, ONE OF THE MAIN WAYS TO MEET the new electricity needs of Latin American countries. This is evidenced by the presence of some of the larger plants worldwide and the high hydroelectric participation in all electricity matrices (Figure 1). Faced with growing prospects for future economic development, an underlying concern is how to respond to the important and growing demands for electricity. In several countries, governments and electric companies have opted to continue with the construction of hydropower plants, especially large-scale ones, as the main means of meeting this challenge. However, major projects formulated in recent years have been put in check by various difficulties, some even stopped. Despite the different political, regulatory, and economic conditions that exist in Latin America, there are common elements in the difficulties faced by these projects. While in the past, large-scale hydroelectricity was the successful response to higher electricity consumption, societies have changed, and this technology faces new cultural, social, and political conditions.

Energy Requirements and Hydroelectric Potential in Latin America

Latin America is a continent in full development that, however, has to face many unmet needs. While countries like Brazil and Chile have had a surprising rebound in advancing their economies, the region is still far from the level of development of major world economies. According to the Economic Commission for Latin America and the Caribbean, 28.8% of the Latin American population lives in poverty. Recent projections estimate that, in the near future, economic growth of Latin American countries will average 5%, which is linked to a similar increase in the electrical matrix. According to figures from the International Energy Agency, by 2035 electricity demand for all of Latin America would be 1,550 TWh, nearly doubling the current demand.

The Growing Social Challenges of Hydroelectric Development

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The challenge is how to respond to this requirement and also seek to control and eventually reduce CO_2 emissions. Fossil fuels become less attractive, and renewable energies such as wind and sun are not yet a stable supply source. Hydroelectricity is an evident response, particularly if the hydroelectric potential of the region is on the order of 693 GW and 3,500 TWh, a significant part yet untapped. The benefits of hydropower are clear: renewable energy, competitive and native, which does not generate greenhouse gas emissions. However, one must not ignore its problems. The sites with the largest hydropower potential are generally located in areas of high natural wealth, or in areas inhabited by indigenous peoples, and the construction of large dams often involves flooding vast tracts of land.

Large-Scale Hydroelectricity in Latin America

During the 1980s and 1990s, large-scale plants were built in the Latin American region, without major environmental problems or social opposition. The Itaipu complex is an icon, owned by Brazil and Paraguay, that began operations in 1984 with an installed capacity of 14,000 MW and, until recently, was the largest hydroelectric facility in the world (Figure 2). Yaciretá, owned by Argentina and Paraguay, with a capacity of 4,050 MW, was completed in 1998.

This tendency to try to develop large-scale hydroelectric projects in the region has continued, and even increased, continuing the preference for developing mega projects on par with projects at the worldwide level. Figure 3 shows a selection of projects in South America that to date are approved, in development, or under construction.

Independent of the country in which they are developed, these projects have much in common, requiring a high level of investment, around thousands of millions of dollars. In all the indicated projects, there is a relevant participation of the state, sometimes as a sole proprietor or in partnership with private companies. The only exceptions are the Chilean projects, which are completely private developments. In most cases, their hydro potential was identified in the decade of 1970–1980, and their development has taken place over decades, due to their technical, social, and economic complexity, to which are often added iterative design processes or extensive environmental approval stages and then construction ones.

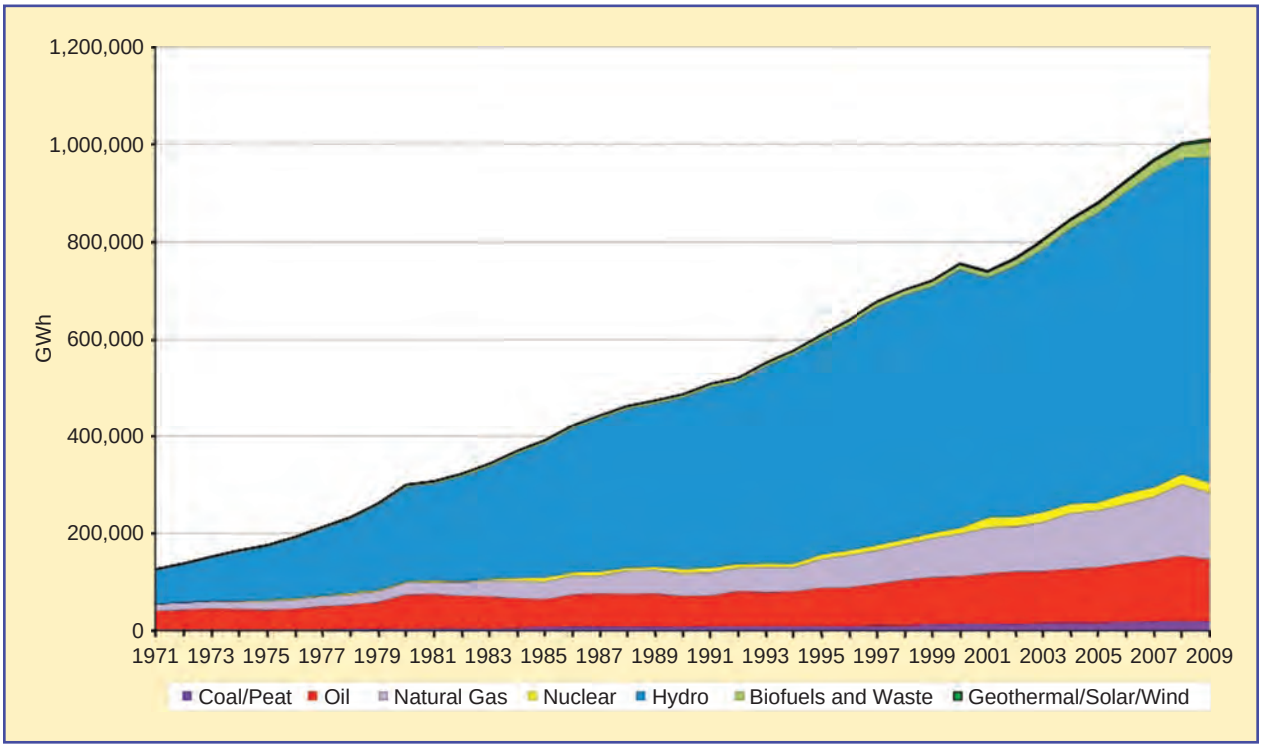

figure 1. Electricity generation by fuel in Latin America (data from the International Energy Agency, 2011).

All hydropower projects in development are facing a number of difficulties and challenges that have defeated them or significantly delayed their implementation.

The Growing Challenges of Hydroelectric Development

Despite this trend, all hydropower projects in development are facing a number of difficulties and challenges that have defeated them or significantly delayed their implementation. The difficulties are not technical or economic but social. Social development in the countries of the region has led to an environmentally conscious citizenry that feels more empowered and is ready to hit the streets—and law courts—to oppose projects that are considered culturally, environmentally, or economically invasive. Environmental care and sustainable economic development are issues that are much immersed in the public opinion, politics, and the community. They pose new challenges to the project developers and the government in power, which must account for how to avoid any irreparable damage to nature of these major projects. Added to this are environmental nongovernmental organizations (NGOs) of an international scale that stimulate and channel people's concerns to oppose these developments. Even recent international laws, agreements, or treaties, such as the protection of indigenous peoples, are becoming obstacles in the development of these projects. In many cases the political authority has had to intervene to unlock their development, to the extent that they have been identified as a strategic need of the country.

Study Cases

As a way to illustrate these trends, we describe four South American cases of large-scale hydroelectric projects that have had to deal with different sources of conflict and developmental problems.

figure 2. The Itaipu plant (© Itaipu Binacional, used with permission).

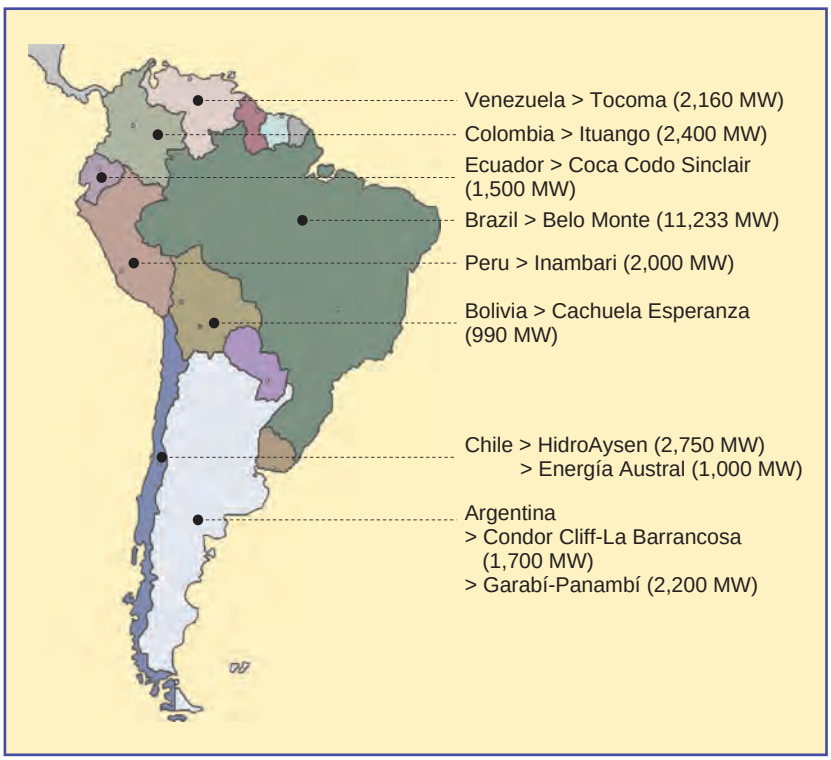

figure 3. Large-scale hydroelectric projects in South America (source: compiled by authors).

figure 4. The Belo Monte site (used with permission from Norte Energía).

Belo Monte, Brazil

By installed capacity, 11,233 MW, this facility would become the third largest hydropower plant in the world. This project would be located on the Xingu River in the state of Pará, Brazil (Figure 4). Early studies of the potential of this river were made in the 1970s, but in 1989 it was decided to freeze its development. In 2001 it was reactivated by the National Energy Policy Council, and in 2011 it received the final environmental permit. The Norte Energia consortium, formed by the state-owned Companhia Hidro Eletrica do São Francisco (49.98%) and eight private companies won the tender for the construction and operation of the plant. The projected total investment is US$13,900 million, and its reservoir will be 502.8 km^2. Belo Monte is part of the Growth Acceleration Program, which seeks to promote economic growth through the development of major infrastructure projects. Currently the construction of the project is stalled by a court order.

Garabí, Argentina

In 1972, Argentina and Brazil signed an agreement to explore the hydroelectric potential of the Uruguay River, located on the border of both countries. Successive studies were conducted to identify and target the uses that could be made, with one of these being Garabí. In 2008 the presidents of both countries confirmed their intention to develop these projects through a joint effort of the state enterprises Ebisa and Electrobras, and in 2012 it was awarded the bid for environmental impact studies and social communication. The project, which is being developed in parallel with the Panambí plant located on the same river, will have an installed capacity of 1,152 MW and supply energy to Argentina and Brazil. The required investment is about US$2,300 million and would be funded largely by the National Development Bank (BNDES) of Brazil. Development feasibility studies of the project are being conducted.

Inambari, Peru

The governments of Brazil and Peru signed an energy integration agreement in 2008, which considered, in addition to other actions, assessment of hydroelectric projects for energy exports from Peru to Brazil. That same year temporary concessions were awarded to develop studies to the Egasur public-private consortium of Brazil. In 2010 the two governments signed a new agreement, which committed to develop up to 6,000 MW for export to Brazil. Inambari would be located in the Amazon region of Cusco, Madre de Dios, and Puno and envisages an installed capacity of 2,000 MW, a 377.66 km^2 reservoir, and an investment of US$4,847 million, also financed by BNDES. Arguing that the deadlines were reached, in June 2011 the Peruvian government cancelled the temporary concessions for the project study. However, the Brazilian government is still interested in developing the project.

HidroAysén, Chile

In the 1970s, when Endesa was a state company, the first studies were made of the potential and feasibility of this project and were updated in 1998 and 2004 when the company was privatized. The HidroAysén project consists of the construction of five hydroelectric plants in Patagonia, on the Baker and Pascua rivers, totaling 2,750 MW of installed capacity (Figure 5). The project is jointly developed by Endesa and Colbún, the two main players in the Chilean electricity market. The investment amounts to US$3,200 million, and the group of plants covers 59.1 km^2. Its environmental impact assessment report was approved in 2011. However, legal questioning of this report awaits the intervention of a Council of Ministers for final approval. Moreover, the company is expecting the definition of the route of the transmission line, and its respective permissions, with a high potential for social conflict, before making a final decision.

Characterization of the Challenges of Development

Some of the challenges encountered by the development of these hydroelectric projects are identified and characterized as follows.

Increased Citizen Participation

The demand for citizen participation is importantly increasing. In Chile, for example, community organizations increased in number from approximately 9,500 in 2002 to nearly 12,000 in 2006 (Figure 6).

This participatory increase has also triggered a strong critique of current participation procedures. Environmental legislation in the countries of the region often considers mandatory citizen participation spaces, seeking for people to be informed through public hearings, press publications, and other media. The planning process also considers a number of stages in which any person may submit comments to the environmental impact studies or the project in general. The companies are made responsible for the effectiveness in delivering information and response to the points raised.

However, at least five major deficiencies in the processes of citizen participation have been detected.

- ✔ In most cases participation applies in the final phase of the projects. In Chile, participation takes place in the environmental impact assessment, that is, after the project has already been designed and feasibility studies have already been conducted. This prevents an early debate on the nature, necessity, and consequences of projects.
- ✔ The period for public participation and development of observations is highly restrictive (for the Chilean case, 60 days). This takes more relevance considering that a project may take years to be environmentally qualified.
- ✔ Participation is seen as debates on topics that, for the bulk of the population, are highly technical.
- ✔ Territorial intervention processes rise social issues that, being inseparable from the environmental ones, are not collected by participatory mechanisms.
- ✔ Social movements in the region are increasingly demanding binding public participation procedures, thus transferring to local communities the final say on the approval of projects.

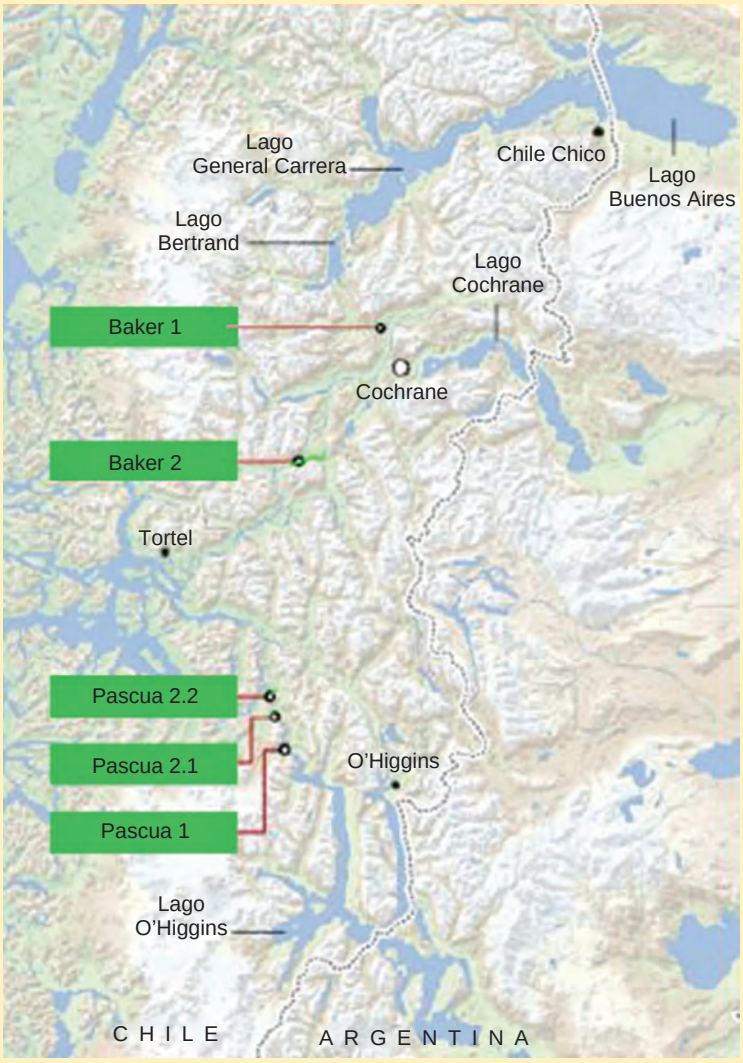

figure 5. The HidroAysén hydroelectric complex (used with permission from HidroAysén).

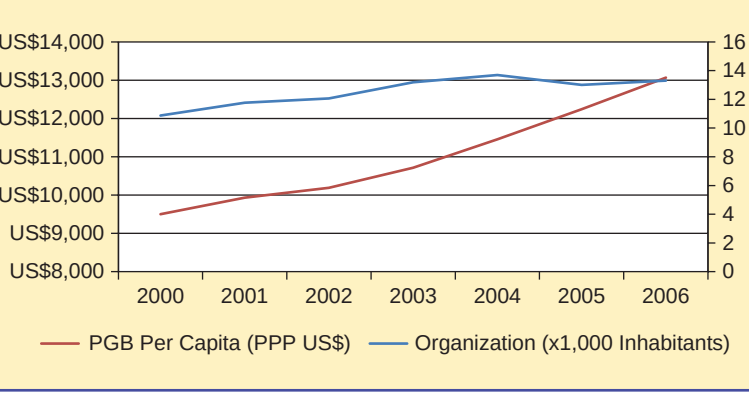

figure 6. PGB versus community organizations (own elaboration with 2010 data from Observatorio Urbano and CIA World Factbook).

Transforming Community Demands

Together with the expansion of participation, the nature of public engagement

Companies must change their business model, improving interaction and teamwork, with the local, national, and global communities with which they interact.

has begun to change. Evidence in the region shows that new fields of uncertainty emerge, fields that communities seek to legislate through participatory processes. Many of the disputes triggered by hydroelectric projects cannot be bounded as a struggle for economic compensation or security. At the center of the discrepancies are also different worldviews, where the affected or vulnerable position is not willing a priori to settle for compensations that are incomparable with what they want to defend. Issues such as environmental preservation, conservation of cultural traditions, and ensuring quality of life are becoming highly valued by the communities while being, at the same time, incommensurable issues that resist traditional metrologies. The protection of the environment, for example, has become one of the major sources of conflict. Indeed, the number of people in the region that, when faced against the trade-off between environmental protection versus economic growth, declare they prefer the first, which has grown significantly in the last decade (Figure 7). This shows how difficult it is for states and companies to economically offset environmental damage.

New Forms of Participation and Citizen Conflict

In addition to the emergence of new fields of uncertainty, new forms of political participation begin to rise. First, the definition of "community" is changing. In conventional use, community denoted a culturally homogenous territorial group. Generally, therefore, community and village or neighborhood were synonymous. Today, however, communities are no longer organized around major administrative divisions and not even around long-term issues such as class, labor, or gender. On the contrary, they are enacted as political groups as an effect of specific issues and threats in what has been called issue-based publics. The result is that communities can no longer be easily identified when seeking consensus and do not respond to traditional party or class alignments.

Second, the high penetration in the region of digital technologies is allowing social organizations to reduce their dependence on traditional communication channels. With the ability to create highly effective publicity, and information and communication spaces at very low costs, communities gain editorial control when spreading their causes, arguments and actions.

Third, the expansion of digital technologies has facilitated the creation of networked organizations. This mediation has allowed community organizations to have, indeed, strong bonds of cooperation and interorganizational cooperation. Organizations help each other, collaborate among themselves, and share advice.

Fourth, following the idea of networked organizations, the figure of "the leader" begins to fade. Indeed, organizations are increasingly structured around distributed leadership: without a single head, community spokesmanship is distributed in several representatives. An emblematic case is Patagonia Sin Represas (Patagonia Without Dams) in Chile, an organization that has at least four political leaders. This situation often baffles politicians and industry experts, accustomed to traditional organizational structures of community groups, trapping the opportunities for dialogue.

Finally, mass demonstrations have increased considerably. Again the Chilean case is paradigmatic. It is estimated that in May 2011, following approval of the HidroAysén project, 170,000 people marched in a period of only five days in Santiago. Protests of several thousand attendees occurred also in most regional capitals, becoming the largest

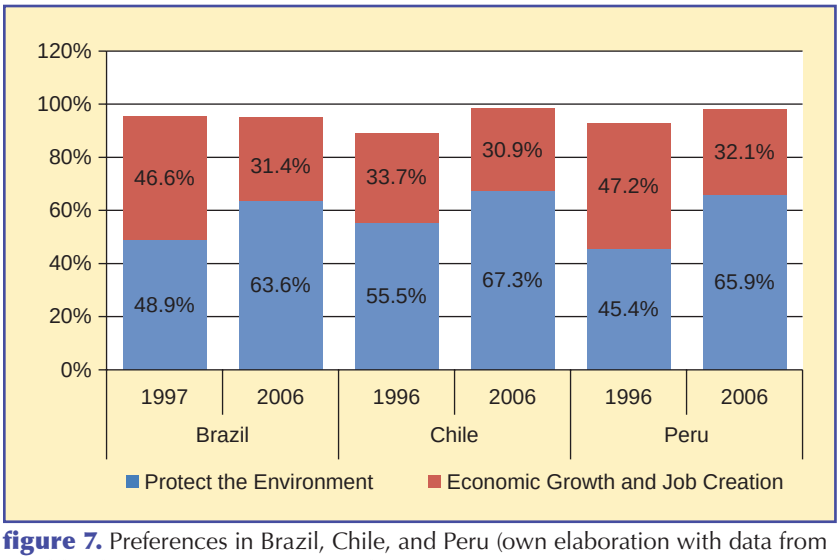

figure 7. Preferences in Brazil, Chile, and Peru (own elaboration with data from World Value Survey 1996–1997 and 2006).

Latin American countries are in a stage of economic and social development, and to progress further, the amount of electricity generation needs to increase.

citizen demonstrations since the return of democracy in 1989. It is important to note that while HidroAysén was the subject of the call, these events served as a space for the mobilization of other demands. The indigenous cause, the rejection of genetically modified organisms, the environmental impact of forestry companies, and even the need for educational reforms were some of the different demands mobilized in these demonstrations. This suggests that hydroelectric projects are understood as the epitome of larger societal dysfunctions and as the catalyst of a broader systemic malaise.

Indigenous Peoples

These conditions are complemented by a critical issue: many of the large hydroelectric projects are sited in areas inhabited by indigenous communities. Thus a key factor in the development of these projects lies in the interaction and negotiation with these communities, their compensation, and relocation. In the case of Belo Monte, indigenous peoples have been the main opponents of the project.

Convention 169 of the International Labor Organization (ILO), ratified in much of the region, has been a key influence in this subject. In 1989, at the ILO annual conference in Geneva, the so-called Convention 169 on indigenous and tribal peoples was adopted. It corresponds to an amendment to the 1957 Convention 107. The agreement recognizes new aboriginal rights and sets certain standards and procedures that must be met by the acceding countries. In connection with large hydroelectric projects, a critical factor is Article 6 of the Convention, which establishes the need for consultation with indigenous peoples whenever legislative or administrative actions may affect them, and Article 15, which makes it compulsory to consult these people before undertaking any action to exploit the natural resources on their lands.

Notwithstanding, while Convention 169 establishes certain general characteristics of how to conduct consultations, most countries have not defined specific procedures to perform them. Without clear legal frameworks, some consultations have been challenged in court for their lack of binding participation.

The Federal Court of Brazil paralyzed Belo Monte because indigenous consultations on the construction of the plant had not been done correctly, breaching the provisions of Convention 169. An ILO report on the same subject stated that the consultations undertaken by the relevant institutions, although they were wide, did not meet the requirements set out in Articles 6 and 7 of the agreement, and there was no consultation with representative institutions but directly with individuals.

For Garabí, one of the main grounds of appeal filed in the Supreme Court was the disrespect of Convention 169. In the ministerial resolution that declared the conclusion and termination of the temporary concession for the Inambari project, it was raised that no new temporary concession would be given if no prior consultation took place.

The Inter-American Commission on Human Rights (IACHR), an organ of the Organization of American States responsible for the promotion and protection of human rights in the Americas, has also been intervening in these processes. In April 2011, the IACHR granted precautionary measures in favor of indigenous communities affected by the Belo Monte project, arguing that the life and integrity of indigenous communities were are at risk for this project. It asked the Brazilian government to suspend the material building of the plant until certain minimum conditions are met, such as indigenous consultation and safeguarding the integrity of indigenous communities.

This IACHR decision illustrates the impact that international actions can have on these projects. In the debate on HidroAysén, the threat of some of the opponents of resorting to the IACHR is latent, requesting its decision. While the IACHR cannot impose penalties for noncompliance with its decisions, it is difficult for a country not to take them into account for the damage to the public image and international relations.

Internationalization

Conflicts related to the construction of hydropower plants are far from being just local or even national. On the contrary, such conflicts have scaled up to become international controversies, with foreign leaders or institutions becoming directly involved in their development processes. The ILO and the IACHR were already mentioned as international bodies involved. Moreover, foundations and NGOs such as Greenpeace, International Rivers, and Amazon Watch sponsor, finance, advise, or are part of the actions aimed at curbing these projects.

The renowned filmmaker David Cameron visited and supported indigenous communities inhabiting the plant site Belo Monte, and the chief Raoni, Kayapó village chief, was recognized as an honorary citizen of Paris, on an international tour to muster support against the dam.

Patagonia Sin Represas, the main NGO leading the opposition against HidroAysén in Chile, comprises several Chilean institutions but also a number of foreign ones, such as the U.S. Natural Resources Defense Council or Global Response. Robert Kennedy Jr, through public actions with the past presidents of the country, actually intervened in the conflict trying to stop the project.

The international scales of these controversies also have significant geopolitical impacts. Garabí and Inambari projects are part of agreements and treaties of economic cooperation between their respective countries and Brazil, agreements involving a long-term business relationship and funding for the development of each project. In this sense, the fate of each project, i.e., its development or failure, directly affects the political relationship of both parties. The Inambari case, in which the Brazilian government accused the Peruvian government of unilaterally suspending the project, shows the tension that can be generated in these cases.

Judicialization of Project Development

Another challenge facing hydropower projects is the increasing judication of the licensing processes and environmental approval, the negotiating with communities, and of the design and study stages. It is increasingly common for the judiciary to decide on the environmental approval process or the granting of permits for the construction of these projects.

The Federal Court of Brazil in August 2012 overturned the environmental license granted to Belo Monte project and ordered the suspension of works.

For HidroAysén, lawsuits were filed in regional courts of appeal against the qualification in favor of the project. These actions even reached the Supreme Court, where there were seven appeals. Finally they were rejected.

In 2011, a group of environmentalists, social organizations, and legislators presented an appeal against the Garabí project in Argentina's Supreme Court, arguing that if built, it would infringe international treaties and violate basic rights of the population: environmental, health, and information and of native peoples. However, the Supreme Court declined jurisdiction.

This has created, in the region, a lack of legal certainty in the processes, in the sense that it is not sufficient to obtain necessary permits, environmental, and others from the relevant institutions, in most cases with a technical profile, as they could be challenged in the judiciary. In practice, their legal validity must finally be ratified in the courts.

Conditions of Development: A Positive Example

Despite the problems that hydropower development has had in Latin America in recent years and the impacts being generated, there is a case that may be of interest for the development of future projects, Coca Codo Sinclair (CCS), a

figure 8. CCS generators cavern (used with permission from Coca Codo Sinclair).

hydroelectric power plant located in the Ecuadorian Amazon, particularly effective in relation to citizen participation and community interaction. It will have an installed capacity of 1,500 MW, with an estimated annual production of 8,743 GWh. The CCS project is part of an Ecuadorian national plan of power plants, called Electrification Master Plan 2009–2020, developed by the National Electricity Council. Its reservoir is 3,600 km^2, and the total investment will be around US$2,000 million. Early studies of feasibility and potential of the Coca River were conducted in the 1980s, updated in 1992, and then again in 2008. In 2009 it received the environmental license and is currently under construction, waiting to start its energy injection to the electrical system of Ecuador in 2014 (Figure 8). It was declared by the National Electricity Council (Conelec) as a project of high national priority, and while it was initially in partnership with Argentina, through Enarsa, Ecuador acquired the shares of its partners in 2009.

table 1. Hydroelectric projects compared.

Project	Country	Installed Capacity (MW)	Reservoir (km^2)	Investment (US$ MM)
Belo Monte	Brazil	11,233	502.8	13,900
HidroAysén	Chile	2,750	59.1	3,200
Inambari	Peru	2,000	377.7	4,847
Coca Codo Sinclair	Ecuador	1,500	3,600.0	2,000
Garabí	Argentina	1,152	642.0	2,278

Given the problems of the other four projects mentioned (Table 1), what may be conditioning the success of this one? First, a distinguishing feature was the high level of citizen participation in the project. It was not just plain information but there was effective participation throughout the project's development, particularly in the various stages of the environmental licensing process. This was accompanied by a major media campaign during the project's development, stressing the need for the development of the plant and the benefits it would bring to the country. A citizen oversight was established to oversee construction of the project, overseeing the environmental impact, working conditions, use of materials, among other things. There was also permanent access to project information. But never the participation was part of the decision making process.

Second, Ecuador's environmental legislation provides that, within the environmental licensing process, one must submit an environmental management plan, which includes compensation to third parties. For CCS, not only were ecological compensations provided but also incorporated financial compensation for the economic and long-term social development of communities affected by the project, making them direct beneficiaries of the project.

Conclusions

Latin American countries are in a stage of economic and social development, and to progress further, the amount of electricity generation needs to increase. By its own characteristics and its availability in the region, hydroelectricity is a good choice as a pillar in the growth of the energy matrix, especially through large-scale hydroelectric plants. However, the conditions and the sociocultural context in which to develop future projects are not the same as those utilized in previous large-scale plants. Currently there are greater demands for citizen participation, sustainable development, respect for the environment, and indigenous peoples, demands that are made by new types of civil society organizations and international regulations.

The difference between the CSS project and the other projects in South America can be partly explained by a difference in the way how the project developed, not in technological terms, but sociological ones: how it was communicated and especially the way in which local communities were integrated as participants.

For the development of such projects in the future, companies must change their business model, from the genesis of the project to its construction, improving interaction and teamwork, both in quantity and quality, with the local, national, and global communities with which they interact.

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Biographies

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