# **21-3 Rocky Mt. Min. L. Fdn. 2019**

***The Foundation for Natural Resources and Energy Law Annual and Special Institutes (formerly Rocky Mountain Mineral Law Foundation Annual and Special Institutes)*  > *Special Institutes* > *2019 Apr (International Mining and Oil & Gas Law, Development, and Investment)* > *Number 3 (International Mining and Oil & Gas Law, Development, and Investment)***

**Author**

Nicolás Castellano - Castellano Carlevaro AsociadosAlejandro Massot - Estudio RandleCaroline O'Driscoll - O'Driscoll & CompanyJulia Torreblanca, Freeport, Arequipa, PeruNICOLÁS CASTELLANO GARD is a Partner with Castellano Carlevaro Asociados, in Montevideo. He has over 14 years of experience in corporate law. He specializes in advising local and international companies in different aspects related to their businesses in Uruguay, including setting up corporations, drafting and negotiating contracts with clients and suppliers, and relationships with the Uruguayan regulatory bodies. In recent years, as Uruguay profited from the renewable energy policies in place, he has been directly involved advising developers, EPC contractors, and land owners, in both photovoltaic and wind energy projects for over 200 MW. In this capacity, he has participated in all stages of the projects, from securing bidding processes with Uruguay's electric utility "UTE", negotiating PPAs, structuring financing, EPC contracting, through civil works execution and installation of wind turbines and solar panels. His area of expertise further involves advising court-appointed administrators in company bankruptcy processes, working together with CPAs. He led the team of lawyers advising private companies in the negotiation and drafting of the first biodiesel 15-year contracts with the stateowned Uruguayan ***oil*** utility "ANCAP", including project financing with public and private banks for over USD 60 million. Nicolas graduated from the University of Montevideo in Law (J.D.) in 2005. He was an associate at Guyer & Regules law firm from 2004 until 2008, working in the Corporate and Banking departments. In 2008 he travelled to China to complete the International Management Program from Boston University in Beijing and Shanghai. He later obtained a Master's degree in Business Administration (MBA) from Boston University in 2010. Since 2010 he has been a partner in Castellano, Carlevaro & Asociados, and acts as a member in the board of directors of cable TV, micro credit, edible ***oil***, and flour mill industries in Uruguay. He is fluent in Spanish, English, and Italian.ALEJANDRO MARÍA MASSOT is a Partner with Estudio Randle in Buenos Aires. Mr. Massot obtained his law degree from the Universidad Torcuato Di Tella. In 2008 he graduated as an LL.M. from the University of Chicago Law School. In 2011 he obtained a Masters Degree in Law and Economics from the Universidad Torcuato Di Tella, being awarded the Best Thesis Award. Mr. Massot advises clients on corporate matters (companies, mergers & acquisitions), energy and natural resources matters, agribusiness, and antitrust law. Mr. Massot has experience in data protection and IP matters. He has been Professor of Natural Resources Law at the Universidad Torcuato Di Tella Law School; he also collaborates with the Universidad Notarial Argentina. He has published extensively on several legal and business matters. He is a member of the Bar of the City of Buenos Aires and of the New York State Bar. He chairs the Argentine Chapter of the International Section of the New York State Bar Association. Mr. Massot is admitted to practice in the City of Buenos Aires and in the State of New York. He is an advisor to the President of the Mining Commission of the Federal Congress of Argentina.CAROLINE O'DRISCOLL is the founder of O'Driscoll & Company (2013), a law firm based in Calgary, Alberta, Canada that specializes in corporate/commercial, regulatory and energy law with a client base consisting primarily of Indigenous governments, trusts and legal entities. An active member of the Law Society of Alberta since 2007, Caroline has acted for various clients on a range of multi-party, multi-jurisdictional, commercial negotiations and transactions that involve indigenous and non-indigenous entities and corporations and various levels of provincial and federal governments in Canada. Specific matters include corporate restructuring, financing and acquisition of a variety of ***oil*** and gas interests and on and off-reserve investments, as well as drafting and facilitation of the implementation of federal legislation under the Indian Act, R.S.C. 1985, c.I-5. Caroline is also an active litigator, appearing in both the Federal Court of Canada and various levels of the Alberta Courts, as well as before the regulatory bodies of both Alberta and Canada's energy regimes. Recent engagements include intervenor representation in the Northern Gateway Pipeline Project (CEAA/NEB JRP OH-4-2011) and Trans Mountain Pipeline ULC Trans Mountain Expansion Project (NEB OH-001-2014), as well as judicial reviews of the Alberta Energy Regulator (ABQB Action No. 1601-00792) and the Aboriginal Consultation Office (Alberta) and the Alberta and federal Crowns (ABQB Action No. 1601-00791) with respect to a pipeline expansion project. Caroline recently completed her M.Sc. (Sustainable Energy Development) and has co-founded Optima Global Inc. (2018), a multidisciplinary team of professionals that collaborates with communities to assess community resources and needs, identify and evaluate potential opportunities for development, and implement all phases of a chosen development project. Caroline earned a B.Ed. and B.Sc. (Environmental Science) and worked as a secondary school teacher, before earning her J.D. (2006, University of Calgary) and LL.M. (2012, York University - Osgoode Hall Law School).JULIA TORREBLANCA is Vice-President of Corporate Affairs for Sociedad Minera Cerro Verde S.A.A., based in Arequipa, Peru. Cerro Verde is majority held by Freeport-McMoRan Inc. Julia graduated as a lawyer from Santa Maria Catholic University, Peru. She joined Cerro Verde in 1997 and has worked in several positions of increasing responsibility since then. She was appointed Vice-President of Corporate Affairs in March 2012. She is in charge of the Legal, Energy, Government Relations, Public and Community Relations; and is the main person responsible for all the company's growth and sustainable development initiatives, alliances signed with local governments and public companies, as well as improving the quality of life of the inhabitants in the surrounding communities and Arequipa. Julia is also the Secretary of the Board of Sociedad Minera Cerro Verde, Vice-President of the Cerro Verde Civil Association and member of the Technical Commission of the Cerro Verde Civil Association, in charge of managing the voluntary contribution of this Company. She is Secretary Director of the National Society of Mining, Petroleum and Energy. Also is Member of the Board of Foreign Trade Society of Peru ComexPeru, Procobre Peru and Director of Board of Directors of Institute of Mining Engineers of Peru. She is an ABAC member (APEC Business Advisory Council), too.

**OVERVIEW**

In the Energy for a Sustainable Future Report and Recommendations of the Secretary-General's Advisory Group on Energy and Climate Change (AGECC), 28 April 2010, it emphasizes the importance of energy and that: "[e]nergy is at the heart of most critical economic, environmental and developmental issues facing the world today. Clean, efficient, affordable and reliable energy services are indispensable for global prosperity."[[1]](#footnote-2)1 In light of this reality, this paper explores the evolution of renewable energy projects in Latin America, as well as the interaction of renewable energies and the existing extractive industry sector. The paper also considers the implications of energy planning and development generally, and the opportunity that it can potentially provide to promote sustainable community capacity development in Indigenous and rural communities. Various case studies and examples are included throughout the paper to provide practical illustrations and highlight lessons learned and benefits gained.

**SUMMARY OF THE EVOLUTION OF RENEWABLE ENERGY PROJECTS IN LATIN AMERICA**

**Introduction**

Renewable energy has historically played a major role in Latin America due to the huge presence of hydropower and liquid biofuels. However in the past decade, non-conventional renewable energy sources (wind, biomass, and solar) ("**NCREs**") have experienced an exponential growth helping countries to reduce greenhouse gas ("**GHG**") emissions, enhance supply reliability by diversifying the energy mix and reduce dependence on imported fuels.[[2]](#footnote-3)2

Latin America now hosts one of the world's most dynamic renewable energy markets. Renewable energy investment has grown 11-fold since 2004 in Latin America, compared with a 6-fold increase worldwide, led by Brazil whose early determination to diversify its transport fuel mix expanded to the whole region, followed by Mexico and Chile. All three countries are all in the list of top 10 largest renewable energy markets globally.[[3]](#footnote-4)3 Between 2012 and 2015, investments in renewables totaled around USD 54 billion accounting for around 25% of the energy supply which is roughly double the share of renewable energy in the United States.[[4]](#footnote-5)4

The predominance of hydropower was historically explained largely to the high share in Brazil, which generates 40% of total regional electricity - almost twice as much as Mexico. In the past five years, 75% to 80% of Brazil's electricity originated from hydro. The relative share of hydropower in total renewable capacity of Latin America has been steadily declining from 95% in 2000 to 83% in 2015. The reasons behind this decline can be found in both the high costs of installed capacity for hydro, and the impact of droughts. On the other hand, NCREs have increased installed capacity by more than triple between 2006 and 2015, from 10 GW to 36 GW.[[5]](#footnote-6)5

In terms of installed capacity, onshore wind and bioenergy (mainly sugarcane residue primarily found in Brazil) have shown the greatest increase in absolute terms since 2000. Also led by Brazil, wind power capacity is still increasing. Brazil alone commissioned a record capacity of 2.7 GW in 2015, while Mexico added 700 MW of wind power in 2015 doubling 2013 additions, followed by Uruguay and Panama who added 300 MW and 230 MW, respectively. The installed capacity of solar power (mainly photovoltaic, **"PV"**) is also growing, though still not at the levels of wind and bioenergy, having experienced growth in Chile, Mexico, and Uruguay. Recently Peru has also joined the PV expansion adding in 2018 a 40 MW PV Project ("Intipampa Solar Power Plant") which alone demanded an investment of approximately USD 52 million, creating a total of 1000 work places during construction, with 60% local labor, resulting in a reduction of C02 emissions by 51,000 tons a year.

In terms of investment in 2015, Brazil represented a little over 40% of the region's total, equivalent to USD 7.1 billion. The second highest destination was Mexico, where renewable energy investment doubled between 2014 and 2015 to reach USD 4 billion. Chile ranked third with USD 3.4 billion (an increase of 150% compared to 2014). Uruguay comes fourth with an investment of USD 1.1 billion. Total regional investment in large hydropower reached USD 9 billion in 2015.[[6]](#footnote-7)6

However, as mentioned, this is a relatively new phenomenon. Latin America and the Caribbean are rich in natural resources, of not only a renewable origin, but also mainly gas, ***oil*** and other minerals. This resulted in a predominance of ***oil*** and gas use in the region's energy mix. ***Oil***'s participation (mainly in transport) in 2013 reached 46% of the total primary energy supply in the region, above the world average of 31%. On the other hand, the electricity sector is fueled partially by natural gas, which represents 23% of Total Primary Energy Supply ("**TPES**").[[7]](#footnote-8)7

Although hydro always provided a great amount of the energy needed to harness these conventional natural resources, penetration of NCRE was still reduced until the last decade. The fact that no country in Latin America was included in Annex B of the Kyoto Protocol and their lower per-capital income prevented the earlier development of NCRE. The costs/output equation for NCREs was until recently worse than that of conventional generation facilities.[[8]](#footnote-9)8

**Reasons and objectives behind the NCRE expansion in Latin America**

There are multiple factors that have driven Latin American countries to increase installed capacity of NCREs to the detriment of other available choices for resolving their energy matrix needs.

On the one hand, developing NCRE provides greater energy independence from imported fossil fuels (liquefied fossil fuels, coal or gas). On the other hand, this diversification enables countries to enhance energy security, reducing vulnerability to climate conditions that typically affect hydropower and ensuring availability in different scenarios. NCREs and hydro have proven to work well together generating synergies.

Finally, the development of NCRE has a significant role in the reduction of GHG emissions, which has become part of the environmental agenda of governments and multilateral organizations across the globe. While this effect was also achieved with the widely used hydro power plants, environmental issues have also determined an increased opposition of different stakeholders to create new such plants and reservoirs. This has caused delays in the construction of large hydro powered plants, which suffer from constant changes in policies and permits. A similar situation occurs with coal -fired generation and nuclear. Both have been criticized, the former because of the environmental consequences and the latter because of security concerns.[[9]](#footnote-10)9

By comparison, NCREs are generally viewed as positive for the environment, and therefore have fewer and lower barriers from the regulatory point of view. While in Europe and the US there have been some public concern against the visual impact of onshore wind power, in Latin America support for wind and solar is still widespread. Given this context, many governments in Latin America are eager to meet public expectations regarding renewable energy and have developed regulatory frameworks to promote renewables.[[10]](#footnote-11)10

In addition, the size of each power plant is significantly smaller than large hydro, and demands less time to become operational (18-24 months for NCRE vs 5-7 years for large hydroelectric). This results in greater flexibility for the installation of new capacity, which is an important aspect considering that demand growth is uncertain. Financially, large hydro power plants demand much more resources (e.g. Belo Monte plant 11,233 MW in Brazil, Pescadero Ituango 2,400 MW in Colombia), or the controversial Aysen project in Chile which was put on hold due to environmental protestors. Economically, it has been argued that NCRE development has promoted foreign currency savings and stimulated the settlement of local manufacturers, creating more employment and economic growth.[[11]](#footnote-12)11

Furthermore, NCREs have helped to expand electricity access in rural areas and isolated communities, with both off the grid and grid solutions.

Renewables have also managed to co-exist with traditional resource activities across the region. Chile has been a pioneer in obtaining synergies between the mining and renewable worlds. As the world's largest copper exporter among other minerals, mining extraction activities represent 30% of the energy consumption in the country. In the past Chile has sought to replace conventional energy with solar energy in mining applications, in a country whose solar resources are among the best in the world. In 2015 the Tarapaca project implemented the construction of 25.5 megawatt (MW) of solar photo- voltaic PV power that is connected to the national grid but sells the bulk of its power under a 20 year power purchase agreement to Compañia Minera Doña Inés de Collahuasi one the largest copper mines in Chile.[[12]](#footnote-13)12

All these factors, coupled with a context of rapidly falling costs of non-hydropower renewables, have provided the drive to develop NCRE so rapidly in Latin America.

**Tools that enable the execution of renewable energy projects in Latin America**

It has been argued among policy makers and financers that some type of subsidy or taxation on fossil fuels is needed in order for NCREs to flourish in any given context of the existing Latin American economies. In addition, countries must provide certainty to investors that the assets will continue to generate enough profit through time to repay investments, so subsidies must be accompanied by strong commitments by governments in support of their long-term energy policies.[[13]](#footnote-14)13

Further, others are of the opinion that the success of NCRE in Latin America is mainly because it is competitive with the very expensive conventional sources of energy, even without subsidy. According to these studies, conventional energy sources in some Latin America countries may be two to three times higher than in the US or Europe. For example, while in the US, energy costs have fallen dramatically as a result of increasing exploitation of shale gas, many Latin American countries have few energy resources and weak infrastructure which result in higher prices.[[14]](#footnote-15)14

Nonetheless, almost all studies agree that once a country has chosen a long-term policy that promotes/implies the development of NCRE, legal and regulatory instruments must support it. Examples include: legally binding and non-binding quantity targets, contracts guaranteeing premium prices, fiscal incentives, import duty waivers and guaranteed access to the grid.

In addition, studies have shown that "fiscal incentives and guaranteed access have relatively high impacts on transitions into high growth rates, whereas fiscal incentives and non-binding agreements increase transitions out of negative and zero growth rates, but to relatively low positive growth rates. Contracts with premium subsidies also have limited impacts on transitions into high growth rates, though they are associated with transitions into the low growth category".[[15]](#footnote-16)15

In relation to financing renewable energy initiatives, support of export credit agencies (**"ECA"**), and the private finance sector, working in the appropriate regulatory frameworks, have played major roles. Since these projects typically involve a large cost in equipment, both for solar and wind, developers usually may be eligible to obtain financing from ECAs in the country of origin of such equipment. Many European electric utilities and manufacturers have decided to undertake the role of developers in Latin America and have utilized this structure. Typically, around 50% of the economic resources come from export credit agency, 30% from commercial banks and 20% from equity.

The participation of ECAs was also influenced by the Organization for Economic Co-operation and Development ("**OECD**"), which in 2012 promoted an agreement on renewable energy and climate change, as well as water projects. These agreements enabled ECAs to offer up to 18-years funding to these projects, with very convenient interest rates. Many European countries such as Germany and Denmark have worked with these tools, while China - one of the world's largest solar panel manufacturer - has lent directly to projects.[[16]](#footnote-17)16 Guarantees often requested for financing include both sovereign guarantees (i.e. "Fondo Fiduciario para el Desarrollo de Energías Renovables - FODER" in Argentina), or direct contracting with public utilities in power purchase agreements (**"PPA"**), with countries acting as guarantors.

Financing contracts have also included remedy clauses that allow the possibility of taking over the projects in case of default. More typical guarantees such as liens and mortgages over land and equipment are in place too, but since land is usually leased instead of purchased, financers want to ensure they can take over the whole array of contracts in order to ensure PPA compliance and thus obtain the necessary cash flow to repay debt.

**Country analysis**

Across the region, there are significant differences in the pace of adoption of renewable power. Uruguay was a clear leader while Brazil has a strong agenda to promote renewables and a longer record of accomplishment - with ethanol production - than almost any country in the world. Further, given the country's scale (and regulatory incentives for renewable projects to source equipment domestically) many global turbine manufacturers have opened factories in Brazil. Mexico and Chile has also seized initiative, especially in developing wind power and solar power respectively.

In the case of Uruguay, it increased its NCRE capacity from 1% in 2013 to 28% in 2017 mostly in onshore wind. In its turn, Brazil has been the region's largest market for wind power for some time and led the regional market for solar PV in 2017, becoming the second country in the region (after Chile) to exceed 1GW of solar installations. Chile ranked third globally for new geothermal power capacity.[[17]](#footnote-18)17

Despite the differences, the overall NCRE growth in the region remained strong in 2017 and 2018, even though the presence of traditional sources of energy will continue to have an important role in the economy. While Brazil, Mexico and Colombia plan to expand their NCRE generation capacity for electricity, they will continue to be important ***oil*** producers and exporters (pre salt ***oil*** deposits in Brazil and the Gulf of Mexico). In the past Argentina was also in that position, but certain political and economic developments prevented continuity. Recent discovery of vast reserves in Vaca Muerta field (shale ***oil*** and gas) as well as a more suitable economic and political environment evidence that they might become exporters once more. Chile's ***oil*** and gas production is minor and remains dependent on energy imports.

While Peru's approach to NCRE is relatively new compared with other countries, two initiatives have proven to be a success in different areas: rural electrification and garbage powered biomass plants.

The Ergon Project In order to reduce the gap of rural electrification and promote electricity access to remote regions, the Peruvian Ministry of Energy and Mines (MEM) has been promoting various electrical renewable energy projects in non-grid areas, among which the photovoltaic project awarded to the company Ergon Peru SAC ("**Ergon**") stands out and can be considered a leading example in the region.

Ergon's PV project implemented more than 87,000 photovoltaic systems as of August 2018, exceeding 50% of required facilities, and benefiting more than 320,000 people from different areas and isolated localities of Peru (including Loreto, San Martin, Amazonas, Lambayeque, Piura, Cajamarca, La Libertad, Huanuco, Junin, Pasco, Huancavelica, Ucayali, Puno, Cuzco, Madre de Dios and Apurímac)[[18]](#footnote-19)18. Total investment will be USD 180 million dollars of which, 90 million dollars have been already implemented as of 2018[[19]](#footnote-20)19. By July 2019, around 200 thousand solar panels will be installed, which will provide users with basic electricity service, with operation and maintenance insured for 15 years. The project also includes greater capacity photovoltaic equipment installation in 4 thousand schools and medical centers[[20]](#footnote-21)20.

The technology implemented consisted of solar panels of 120 Wp and a unit called the "DC Energy Box", which integrates a 100 Ah battery and a charge controller that allows the energy regulation to guarantee the availability of 180 Wh dayly and a two-day autonomy. To the above is added a lighting equipment with 3 LED lamps of 7 W each, a universal charger for cell phones and dual outlets for devices such as TV and radio in 12 Vdc, often used in rural areas of the country. Each installed photovoltaic system does not entail any cost for the beneficiary, neither for the materials nor for the installation itself. The user only assumes a 10 soles monthly fee, according to the tariff set by the Peruvian public energy regulatory entity. The Project is funded by Sumitomo Mitsui Banking Corporation and Corporacion Financiera de Desarollo S.A. ("COFIDE")[[21]](#footnote-22)21.

Huaycolor Biomass Plant Another area where Peru has been successful is in the use of biomass thermal power plants powered by garbage, which offers an ecological alternative that must be handled intelligently and with conscience. The first renewable energy plant, "Huaycoloro Biomass Thermal Power Plant", began operations on October 28th, 2011. Thanks to this plant, 3.5 million kilos of garbage received by the Huaycoloro sanitary landfill per day, which constitutes about 35% of the solid waste generated by the entire city of Lima, is converted into electric power[[22]](#footnote-23)22.

The Huaycoloro Biomass Thermal Power Plant (with an investment of 14 million dollars and an installed capacity of 4.8 megawatts)[[23]](#footnote-24)23 is the third of this kind in Latin America, behind Mexico and Brazil[[24]](#footnote-25)24. The project was supported by the World Bank and was endorsed by the United Nations. The plant includes: Biogas supply, power house, civil and electromechanical works, 0.48 / 22.9kv[[25]](#footnote-26)25, 60Hz elevating substation located in the district of San Antonio, province of Huarochirí, department of Lima[[26]](#footnote-27)26.

A more detailed analysis of country specifics is included in Annex 1 based on information available in Global Climatescope from Bloomberg[[27]](#footnote-28)27

**SYNERGIES BETWEEN EXTRACTIVE AND RENEWABLE INDUSTRIES - CHALLENGES, OPPORTUNITIES AND BENEFITS**

As per their most customary definition, renewable energy sources are replenished rapidly, on a human timescale, by natural processes and cycles such as sunlight, wind, waves and geothermal heat, among others. On the other side, extractive industries work with finite resources removed from the aggregates of the earth, the main example being the development and exploitation of minerals, and ***oil*** and gas, which have a critical and undeniable impact on the environment. Nowadays the world is heading towards a vision of sustainable development, reduction of the carbon footprint and the challenge of a global energy system with zero greenhouse gas emissions, all of which lead us to question: is a synergy between renewable energies and extractive industries achievable?

**Sustainable Extractive Practices**

The mere concept of extraction appears to collide with sustainability and renewable resources of energy, as it is clear that minerals and fossil fuels are available in limited amounts and will not be replenished for arguably thousands of years. Does this necessarily imply that extractive industries are not compatible in any way with the idea of sustainability?

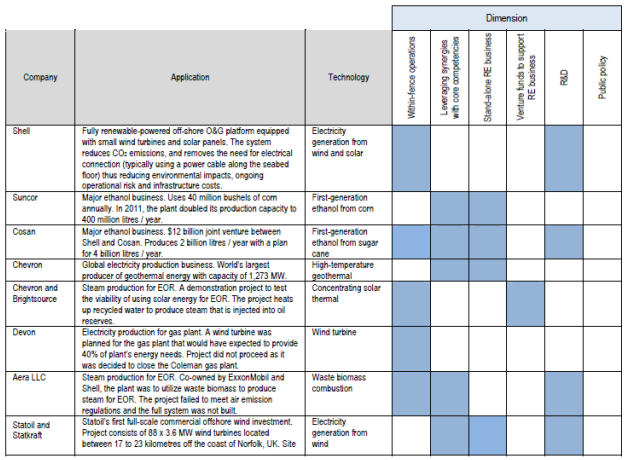
The World Commission on Environment and Development defines sustainable development as *"the process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are made consistent with future as well as present needs"*[[28]](#footnote-29)28. it can be argued that the extractive industry has made contributions towards sustainability by moving toward the adoption of clean energy resources in their operations from the very early exploration stages to the final closure works.

In this sense, in 2017 the United Nations Development Program launched a joint report with the International Finance Corporation (**"IFC"**) and International Petroleum Industry Environmental Conservation Association (**"IPIECA"**)[[29]](#footnote-30)29 illustrating how the ***oil*** and gas industry can contribute to address the 17 Sustainable Development Goals[[30]](#footnote-31)30 set by the United Nations for 2030, one of them being affordable and clean energy. The increase of alternative energies in the global energy mix is one of the items included in this report. Even if fossil fuel energy resources are not renewable themselves, resources employed for extraction and processing of raw materials can be renewable and sustainable. Taking into account that mines and wells are usually located in remote, not grid-connected areas, onsite power needs often covered by high-priced diesel generators might be replaced by solar and wind power plants, which would also mitigate costs in the future, as it is expected to continue decreasing - solar panel price decreased 75% within 3 years.[[31]](#footnote-32)31

**The Business Case**

From a business perspective and "conservative point of view, renewable energy is a competitor to fossil fuels. However, recently renewable energy is being used to extract and produce fossil fuel resources, which makes it more difficult to view them as clear competitors."[[32]](#footnote-33)32 In reality, the global ***oil*** and gas sector has been investing in renewable energy technologies and projects for years. "Between 2000 and 2010, U.S.-based [***oil*** and gas] companies invested roughly $9 billion in renewables (wind, solar, biofuels) - roughly 20% of the total U.S. renewable investment of $47 billion over the same period."[[33]](#footnote-34)33 In fact, the Pembina Institute identified six dimensions of renewable energy activity by ***oil*** and gas companies in particular: (1) within fence opportunities, (2) leveraging core competencies, (3) standalone renewable energy businesses, (4) venture funds, (5) research and development support, and (6) public policy advocacy.[[34]](#footnote-35)34 See **Figure 1** for a summary of various company case studies demonstrating these dimensions as compiled by the Pembina Institute.

**Figure 1. Dimensions of Renewable Energy Applications by the Extractive Industry**[[35]](#footnote-36)35



There are several drivers prompting the extractive industry to take an active role in the development and use of renewable energies including: (1) regulatory e.g. biofuel content standards, renewable portfolio standards, feed-in tariffs, emerging GHG obligations, (2) ideological e.g. environmentally motivated customers, employees and project host communities, (3) public relations and (4)"first mover" advantage.[[36]](#footnote-37)36 For example, "there is evidence that energy return on energy input (EROI) in fossil fuel production is declining, and that fossil-based transportation fuel demand in North America has peaked. In light of this, companies that wish to be in business for the long term need to be (and in some cases are) 'crossing the energy bridge' by developing a portfolio of transition investments in renewable energy. . ."[[37]](#footnote-38)37

Regulatory and Policy Influences

The switch to alternative energies solutions might be boosted by widespread regulatory and policy changes establishing carbon pricing measures and mandatory percentages of renewable energies to be reached by a certain date. For example, Chile passed a bill in 2013 mandating that 20% of its energy come from renewable resources by 2025[[38]](#footnote-39)38 and according to Climatescope 2018[[39]](#footnote-40)39 is currently the world's most attractive market for renewable energies investment, with much of its renewable capacity being used by the mining industry.[[40]](#footnote-41)40 Zaldívar copper mine in Chile, a joint venture between Antofagasta and Barrick Gold, is planned to be the first mine to operate with 100% renewable energy.[[41]](#footnote-42)41

As per Argentina, a long term target of 20% of power demand to be covered by renewable energy generation was set by law for 2025. The first agreements have been entered between mining companies and private energy companies for the provision of renewable energy, such as recent agreement for 10 years between wind energy company Genneia and Oroplata -a holding of Canadian's Golcorp.[[42]](#footnote-43)42

Corporate social responsibility campaigns also influence the extent to which fossil fuel companies invest in renewables and there is a range of attitudes with respect to them. For example, in a 2014 paper titled "Relationship Between Large ***Oil*** Companies and the Renewable Energy Sector", ExxonMobil was noted as openly admitting "that does not want to address less profitable renewables, while BP, in part because of external pressures, currently tends to sell its renewable energy business. In contrast, Royal Dutch Shell and Chevron own remarkable and diverse interests in the renewable energy business, with both companies seeing future opportunities in the renewable energy market."[[43]](#footnote-44)43

Operational Cost Efficiencies

There are a variety of practical renewable energy applications that are already being used by the extractive industry in operations including: (1) electricity generation, (2) heating/cooling, (3) motive force and (4) liquid transportation fuels.[[44]](#footnote-45)44 Extractive industries are now faced with the opportunity to lower costs and improve reliability, safety and sustainability by rethinking operational processes. A report from Finch Solutions suggests that wind and solar power will become integral to powering mining operations, as the cost of renewable energy falls.[[45]](#footnote-46)45 ***Oil*** and gas industry -a major consumer of energy- is currently embracing the use of renewable energies to supply electricity for offshore production and thermal energy required for enhanced ***oil*** recovery technique.[[46]](#footnote-47)46

There are already several pilot projects towards the use of renewable energy in the corporate sustainability strategy: one example is Italian multinational ***oil*** and gas company Eni, who has developed *Green Diesel* derived from the hydrogenation of vegetable ***oils***, and is currently working on the creation of biofuel from municipal waste.[[47]](#footnote-48)47 As per the mining industry, Rio Tinto's Diavik Diamond Mine in the Canadian Arctic[[48]](#footnote-49)48 supports a wind farm which provides 11% of the mine's power needs while Australian company Sandfire Resources has already installed a solar power plant project.[[49]](#footnote-50)49 See also **Figure 2** below for additional examples for renewables being used in the extractive sector.

**Figure 2. Summary of Renewables Applied in the Extractive Sector**[[50]](#footnote-51)50

| **Site** | **Country** | **Peak Capacity** | **Technology** |
| --- | --- | --- | --- |
| Midway-Sunset ***Oil*** | USA | 500kW | Photovoltaic system |
| Field |  |  | (electric power) |
| ***Kern*** River ***Oil*** Field | USA | 750kW | Photovoltaic system |
|  |  |  | (electric power) |
| Louisiana Bayou ***Oil*** | USA | 17.85kW | Photovoltaic system |
| Field |  |  | (electric power) |
| Suizhong 36-1 ***Oil*** Field | China | 1.5MW | Wind power system |
|  |  |  | (electricity power) |
| Beatrice ***Oil*** Field | Scotland | 5MW | Wind power system |
|  |  |  | (electricity power) |
| Utsira Nord ***Oil*** Field | Norway | 6MW | Wind power system |
|  |  |  | (electricity power) |
| McKittrick ***Oil*** Field | USA | 300kW | Solar thermal system |
|  |  |  | (heat water, produce |
|  |  |  | steam) |
| Caolinga ***Oil*** Field | USA | 29MW | Solar thermal system |
|  |  |  | (heat water, produce |
|  |  |  | steam) |
| Amal ***Oil*** Field | Oman | 7MW | Solar thermal system |
|  |  |  | (heat water, produce |
|  |  |  | steam) |
| Rocky Mountain ***Oil*** | USA | *217kW* | Geothermal power |
| Field Testing Center |  |  | system |
| ***Feasibility stage*** |  |  | (reuse of thermal water |
|  |  |  | discharged from |
|  |  |  | exhausted ***oil*** and gas |
|  |  |  | fields) |
| Fort Liard ***Oil*** and Gas | Canada | *700-1000kW* | Geothermal power |
| Field |  |  | system |
| ***Feasibility stage*** |  |  | (reuse of thermal water |
|  |  |  | discharged from |
|  |  |  | exhausted ***oil*** and gas |
|  |  |  | fields) |
| Barrick Gold's Veladero | Argentina | *2MW* | Wind generator |
| Mining Project |  |  |  |
| Oroplata | Argentina | *38MW* | Wind power system |
|  |  |  | (operated by a third |
|  |  |  | party who solds clean |
|  |  |  | energy to the mining |
|  |  |  | operation) |
| YPF Luz | Argentina | *100MW* | Wind Farm |
|  |  |  |  |

Challenges

It is important to recognize that the synergy between the extractive and renewable industries is not without challenges, including the practicality of ensuring grid access, integrating renewables into standard extractive industry engineering templates, competing for capital against higher return fossil fuel projects and the very real issue of overcoming the general lack of renewable energy technology literacy .[[51]](#footnote-52)51

Above that, it must be understood that notwithstanding its fast development during the last decade, renewable energy still has a number of challenges going forward such as, for example, reliability of renewable energy supply and battery storage technology.

Compared to traditional sources of energy, which are highly centralized, renewable energy power plants provide us a decentralized model, where more (and smaller) power plants are spread across a large area and working together to provide the required power. This model does face the so-called sitting and transmission[[52]](#footnote-53)52 problems. The first one refers to the need to enter several different negotiations with different land owners to get access to the land, which can increase costs, delay and potentially shut-down projects. The latter issue is related to the incompatibilities between the existing transmission infrastructure (built to serve large fossil fuel plants) and required by renewable energies.

The battery storage issue refers to the lack of technology that has been developed allowing batteries to store the energy produced from renewable sources and it has been pointed as one of the main reasons why fossil fuels are still dominating the scene. New technologies, however, should make this a short-lived problem as next-generation technology research and development leading to batteries that can store electricity in bulk for more than 10 hours is currently underway.

Despite these obstacles, it is clear that a synergy between extractive industries and renewable energies is not only achievable but already happening and it is expected to increase in the future. For renewable sources to increase their share in the energy market, governments must provide the right incentives through legislation and other tools to favor investigation and development on them, to make them more available, cheaper and more efficient.

**OVERVIEW OF A MULTI-DIMENSIONAL APPROACH TO ENERGY PLANNING AND DEVELOPMENT**

**The Inherent Nature of Energy Planning and Development**

Energy planning and development is inherently multi-faceted since the energy policy decisions that enable it involve the balance of "priorities for security and cost of supply, the national and global environment, economic growth and development, jobs, poverty eradication, import dependency, resource income, technology leadership, and diplomatic relations."[[53]](#footnote-54)53 A good energy plan is suggested to be "a program based on rigorous research on issues related to energy supply and demand, energy prices, technology supply and demand, population growth, environmental, social, technological success in harnessing the energy and influence the political situation of a country."[[54]](#footnote-55)54

Although present day concerns with respect to the security of ***oil*** supply are similar to the concerns of 30 years ago, the landscape of international energy policy has changed,[[55]](#footnote-56)55 most noticeably with the emergence of climate mitigation as a central energy policy issue. Furthermore, "[w]hile there is no absolute shortage of reserves, ***oil*** companies are being forced to turn to more difficult, costly, and politically and environmentally sensitive sources of supply to replace declining output from existing fields and meet rising demand. . . "[[56]](#footnote-57)56 Technological innovation has enabled the exploitation of energy in more rural areas and extreme environments around the world e.g. drilling for ***oil*** in the Arctic, West Africa and Brazil, extraction of ***oil*** sands in Alberta, Canada, ***oil*** exploration in the Gulf of Mexico, off-shore wind developments on U.S. East Coast.[[57]](#footnote-58)57 However, many of these initiatives are facing opposition, arguably due to failures of the regulatory systems and project management not meeting local community expectations.[[58]](#footnote-59)58 Thus, the importance of a multi-dimensional approach to energy planning and development cannot be overestimated.

Further, while the emergence of renewable energy in the global energy landscape contributes to the reduction of GHG emissions, provides independence from fossil imported fuels in many cases, and helps economic growth mostly in rural areas, it has also created major challenges in both the long-term planning and the day-to-day operation of electrical systems. In addition, some who have not benefited from the renewable initiatives and feel neglected have expressed their opposition and should be taken into consideration. In short, "[t]here is [] a need to address people's perceptions, and expectations and concerns of communities that are hosting energy infrastructure while at the same time considering the needs of policy, regulation and industry development and path-dependencies between those."[[59]](#footnote-60)59

As explained earlier in the paper, Latin America has heavily relied on renewable resources for electricity generation for decades, but mainly using hydro powered facilities. With the irruption of NCRE sources such as wind, and solar, it is necessary for policy makers and key players to understand the behavior of these new elements in regards to climate variables and global atmospheric patterns. The challenge is and will be to determine the optimal input of NCRE sources in the energy mix, which can help complement the electrical matrix, with the complexity of including climate change in the analysis. The global increase in temperatures, as well as other climate phenomenon, can have direct effects on the availability of NCRE resources, and therefore on the electricity generation from them.

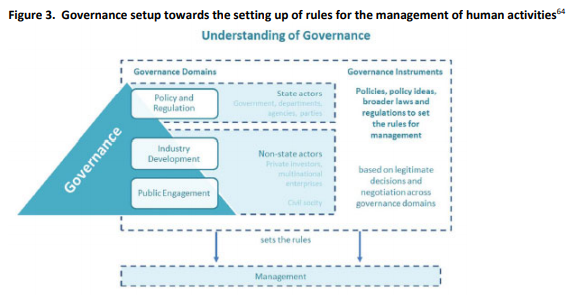
Studies show a higher variability for wind power than for solar power generation. They also show that Brazil plays a significant role regarding renewable energy integration in Latin America, since it has the strongest capacity to complement and be complemented by several Latin American countries.[[60]](#footnote-61)60 For example in January 2019, Brazil, Argentina and Uruguay were affected by a very intense heat wave. This caused Brazil (which has lots of NCRE and traditional resources) to import emergency electricity from Uruguay. Uruguay alone exported 878.000 MWh in 2018 to Brazil, and 443.000 MWh to Argentina and Brazil only in January 2019.[[61]](#footnote-62)61

Thus, energy planning and development will continue to depend on the interaction of different and complex factors (both internal and external) which each country will have the challenge to resolve in any given context, with appropriate decisions based on quality information, while also considering the impact on the different stakeholders and taking into account both local and global priorities.

**Governance**

"Governance of natural resources describes how societies make decisions, share power, ensure accountability and take actions in response to diverse dynamics and complex challenges today. . . . and sets the stage within which management occurs."[[62]](#footnote-63)62 It is a long-term societal project to change energy supply and it "is a complex task affecting different actors in government, economy and civil society, touching upon different policy fields, and including different jurisdictions at the local, regional, national and international level."[[63]](#footnote-64)63 Understanding the interaction of the various actors involved in governance is fundamental if meaningful and successful energy planning and development is to be achieved. **Figure 3** below provides a schematic overview of governance generally.

**Figure 3. Governance setup towards the setting up of rules for the management of human activities**[[64]](#footnote-65)64



"The increasing interest in renewable energy sources over the last decade have been accompanied by a corresponding increase in the academic literature" as researchers seek "to understand why certain countries, or regions within countries, have been more or less successful at developing policies for and actually exploiting renewable energy."[[65]](#footnote-66)65 In an investigation of the governance of the ***oil*** sands development in Alberta, Canada, it was observed that the non-state actors e.g. industry and Indigenous communities, negotiate and contest industrial activity but the dynamic between them reflects a hierarchy, with the state devolving its responsibilities to the market and the communities traditionally being seen as recipients of energy decisions, rather than active partners in the decision-making.[[66]](#footnote-67)66 Furthermore, the existence of the phenomenon of regulatory capture i.e. interest groups holding significant sway over regulatory bodies, raises concern of a gap between actual and perceived public interests[[67]](#footnote-68)67 which, in turn, frustrates meaningful and equitable energy planning and development.

"More recently, researchers and practitioners have begun to emphasize the role of social, economic and political power in energy transitions, most explicitly expressed through concepts of energy justice and energy democracy"[[68]](#footnote-69)68 Renewable energies in the energy mix arguably provide advantages of availability, access and modularity of enabling technology and variety of ownership options that are mobilizing the "reclaiming [of] the energy sector and shifting political power to workers, households, communities, and the public, in opposition to a centralized, corporate, utility-scale"[[69]](#footnote-70)69 energy model. Thus an awareness and accounting of the various governance actors is crucial for successful energy planning and development.

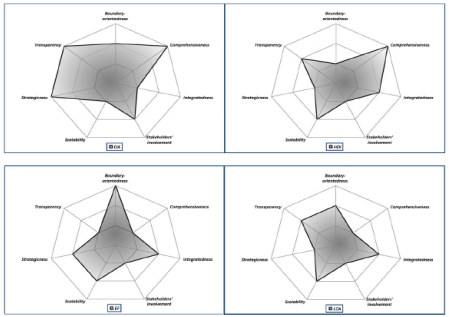
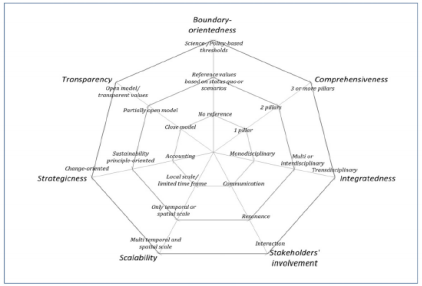
**Global Commitment to Sustainability**

"As the pace and scale of global environmental challenges grow and social problems become more apparent, there is a need to develop governance responses that are approached from a science perspective and other knowledge systems, such as indigenous, traditional or local communities."[[70]](#footnote-71)70 This is evidenced by the 2030 Agenda for Sustainable Development, including the 17 Sustainable Development Goals, that was adopted by all member states of the United Nations in 2015.[[71]](#footnote-72)71 So, it is not surprising, regardless of governance structure or dynamic, to see various jurisdictions incorporating various multi-disciplinary, science-based strategies into their energy development policy goals and objectives. The most robust end of the spectrum of strategies are those which incorporate principles of sustainability, such as a holistic approach; intergenerational equity; good governance (i.e. subsidiarity, proportionality and public participation); the precautionary principle; irreversibility; regeneration; substitutability; critical loads; and the polluter pays principle.[[72]](#footnote-73)72

There are already a variety of multi-dimensional ways in which sustainability is being assessed and considered for energy planning and development, including tools and methodologies such as life cycle assessment, ecological footprint analysis and environmental impact assessment.[[73]](#footnote-74)73 In fact, government legislation and regulations in various jurisdictions have mandated the use of some of these methodologies as a prerequisite for energy project approvals. However, it is important to recognize that many of these approaches were developed in other contexts and have been transposed to sustainability assessment.[[74]](#footnote-75)74 Subscription to a particular analytical method is ultimately, whether intentional or not, enforcing "a specific world view as the legitimate measurement tool by which to assess the sustainability performance of a particular project/plan/programme."[[75]](#footnote-76)75

Sala, Ciuffo & Nijkamp, provide a spectrum of relevant criteria for assessing the capability of various methodologies to assess sustainability:[[76]](#footnote-77)76 (1) boundary-orientedness i.e. no reference to science and policy based thresholds, (2) comprehensiveness i.e. 1 - 3+ pillars of sustainability, (3) integratedness i.e. mono-disciplinary to trans-disciplinary, (4) stakeholder's involvement i.e. communication to interaction, (5) scalability i.e. local/specific project/limited timeframe to multi-temporal and spatial scale, (6) strategicness i.e. accounting methods to solution-oriented methods, and (7) transparency of values i.e. closed to open model.

**Figure 4. Spectrum of criteria for assessing the capability of methods to address sustainability and an example of the evaluation of four methods (EIA - Environmental Impact Assessment, HDI - Human Development Index, EF - Environmental Footprint, LCA - Life Cycle Assessment)**[[77]](#footnote-78)77



As shown in **Figure 4** above, there are significant shortcomings in methodologies that are currently being used and that are perceived to being fully capable of facilitating sustainable, multi-dimensional energy planning. One of the most common methods used in energy development regulation is environmental impact assessment (EIA) but it can vary in and of itself depending on the scope that is established for it. The International Mining for Development Centre (**IM4DC**) proposes that "[t]he policy and legislative instruments adopted by government should seek to encourage the following objectives": life cycle approach, leaving a long term legacy, engagement, alignment, building capacities, partnerships, balance between operational and regional context, coordination across operations, adaptive management and flexibility.[[78]](#footnote-79)78 References to regional context and adaptive management clearly indicate consideration of cumulative effects and a dynamic project management strategy that will require on-going monitoring and adaptation of the strategy for the life of the energy development being contemplated. This, once again on a project-specific level, supports the position that a multi-dimensional approach to energy development is critical for meaningful and sustainable outcomes.

**CONSIDERATION OF ENERGY DEVELOPMENT INITIATIVES AS AN OPPORTUNITY TO EFFECTIVELY BUILD SUSTAINABLE COMMUNITY CAPACITY IN INDIGENOUS COMMUNITIES**

**Renewable Energy - A Community Capacity Development Opportunity**

Renewable energy has proved to be have a significant impact in rural areas habited by local communities. According to OECD, renewable energy-based off-grid electrification, when supported by adequate access policies, can stimulate small-scale economic activity and entrepreneurship. Renewable energy development has also integrated directly with some farmers and forest owners increasing and stabilizing their incomes: land owners and farmers can now utilize the land in long or short term leases to install either wind farms, or solar panels, while still harnessing the remaining land for traditional agricultural or cattle breeding activities. Many have also chosen to use renewables in their activities. It has also created new jobs in the areas, in the short term during construction and development but also disseminating related technical skills in the local workforce needed for operation and maintenance in the long term. Lastly, renewable energy projects provide remote rural regions with the opportunity to produce their own energy (electricity and heat in particular), in place where connection to the grid is overly expensive due to the lack of population.[[79]](#footnote-80)79

At the moment 95% of Latin America's population has electricity access (99% urban and 82% rural). However, across the region 56 million people still rely on traditional uses of biomass for cooking and heating, while more than 15 million lack access to electricity, most of them living in Andean or Central American countries.[[80]](#footnote-81)80

In order to complete electricity access to remote rural communities, policy makers agree that off the grid renewables, which include both mini-grids and stand-alone systems, can make the difference since they offer multiple advantages to traditional grid extension. The advantages with off-grid renewable solutions include their installation speed, as well as the fact that they can be tailor made to cater for the region's necessities. Financially and economically, recent cost reductions make renewable energy technologies the most competitive option to expand electricity access in rural areas with high-quality resources. Numerous examples of this phenomenon can be found in solar PV in the Andean highlands, and wind or micro - or mini-hydropower in mountainous areas (Andes and the Amazon).[[81]](#footnote-82)81

Despite these advantages, in a number of rural regions large-scale renewable energy initiatives caused communities to oppose installation. When policy makers have tried to simplify renewable energy by putting focus on large scale installations and an limited number of key actors supported by automatic initiatives, some hosting communities have felt neglected: they deal with all the negative consequences while investors and workers from outside the region get all the benefits. That is why, policy makers recommend taking into account active participation of rural inhabitants and better promote the impact on regional economies of renewable energy initiatives. The challenge is to properly asses their success in this sense: while GHG emissions an electricity generation can be calculated with precision, economic development is harder to measure.[[82]](#footnote-83)82

**Community Engagement and Capacity Building Initiatives by Industry**

Corporate social responsibility has long been connected to the concept of the three pillars of sustainability and "[a]ccording to John Elkington (1997), a business is sustainable when it fulfills the expectations of the triple bottom line of economic prosperity, environmental quality and social justice."[[83]](#footnote-84)83 Thus, it is not surprising to find that industry engagement to build sustainable community capacity in Indigenous communities is not a new phenomenon. It has been happening for years and "[m]any governments, companies, and host communities have established agreements to enable the realization of the developmental potential of extractive industries at the local level. This trend has been driven by increasingly prominent expectations that extractive industries should contribute positively to the long-term development goals of affected communities and countries."[[84]](#footnote-85)84 There are a variety of drivers that compel industry to engage with communities, including: government requirement, social license, competitive advantage, customer loyalty, global certification requirements, local workforce productivity, access to land, risk management and reputation,[[85]](#footnote-86)85 But agreements are most commonly developed for the following scenarios:

1. Where government regulations specifically require developers to enter into a formal agreement;
2. Where indigenous lands are present and there is a legal requirement to negotiate the conditions of access/use with the traditional landowners; and
3. Where there have been conflicts between a developer and local communities, and the developer has voluntarily negotiated an agreement in an effort to resolve these conflicts.[[86]](#footnote-87)86

There are also a variety of names given to the agreements made between communities and industry to achieve these goals, including: community development agreement (CDA), participation agreement, partnership agreement, impact benefit agreement (IBA), investment agreement, benefits sharing agreement, empowerment agreements, landowner agreement, and community joint ventures.[[87]](#footnote-88)87

In a review and comparison of benefit sharing modes and policy models used in relation to ***oil*** and gas exploration and the energy sector in the Russian and U.S. Arctic, Tysiachniouk and Petrov identify four modes:[[88]](#footnote-89)88

1. Paternalistic Mode - This mode is state-dominant, with the state government defining, monitoring and intervening in company policy and practice. "The company either (partially) takes a role of the state or contributes significantly to some elements of state support to local communities and Indigenous peoples."[[89]](#footnote-90)89 Unfortunately, polices of this nature do not cultivate an environment for community development. Instead, they can often foster unrealistic expectations on the part of the impacted residents as the engagement is perceived to replace government function and companies then fall victim to either community or government expectations that the company will support the community.
2. Narrowly Defined Company Centred Social Responsibility (CCSR) Mode - This mode is company-driven, in that globally developed standards or standard imposed by various international organizations, funding agencies, or legislation are adopted by the company but in practice the companies "frequently tend to fulfill only a bare minimum required by both local and global stakeholders. In many cases the CCSR-based benefit sharing programs are designed to please the investors and shareholders and to address the needs of local communities only to the extent necessary to obtain the 'social license' to operate."[[90]](#footnote-91)90 Ultimately, this is a business strategy that is prone to the rules changing based on the decisions made by a company, its investors or the organizations on which it relies for its standards, not the impacted residents. e.g. Surgutneftegaz and Lukoil agreements in the Khanty-Masnsi Autonomous District of Russia.[[91]](#footnote-92)91
3. Partnership Mode - In theory, this mode is better positioned to promote development and self-reliance of impacted communities since the energy company, government and impacted community are all party to the agreement. It has the ability to be more procedurally equitable but since it involves community representation it does not necessarily ensure that all impacted individual stakeholders and/or beneficiaries' concerns and interests are addressed e.g. Sakhalin Energy and Exxon Neftegaz Limited agreements with Sakhalin, Russia.[[92]](#footnote-93)92
4. Shareholder Mode - This mode involves dividend funds and can potentially involve several 'layers' of benefit sharing, with various impacted group members being shareholders in one or more entities that contract with industry for a share in project revenue e.g. Alaska North Slope Regional Corporation. Shareholder eligibility requirements can be a potential limitation but strong institutions and corporate entities can potentially diversify investment portfolios and reduce dependency on a specific project or resource.

Regardless of industry's motivation or mode for engagement, if a community has full ownership over the resource and land that is subject to development, there is a strong likelihood that the "control over the pace and scale of development can be exercised locally and the allocation of costs and benefits negotiated are more equitably distributed."[[93]](#footnote-94)93 However, if there is no local control of the energy resource, communities and groups are left vulnerable and dependent on government and, if "government objectives appear to be directed more to resource revenue generation than community impact management, . . . , then the community or regional authority may be largely on its own."[[94]](#footnote-95)94 This vulnerability is further exasperated by cumulative effects of multiple projects that are developed in isolation. This reality is true for both indigenous and non-indigenous communities. Also, even if a community does have ownership over its resource, government regulation and lack of local community capacity might still unintentionally be the cause of adverse and irreparable community impacts from energy development. For example, "[s]ingle industry communities, particularly those based on non-renewable resources, often do not survive the depletion or decline in viability of their resource base. The mining "ghost towns" of the early 20th century bear are testimony to this."[[95]](#footnote-96)95 Thus, "[t]he role of governments is especially important where local communities lack capacity or sufficient resources to effectively represent their position."[[96]](#footnote-97)96 These realities are equally relevant for both extractive and renewable energy development initiatives.

The International Finance Corporation World Bank Group identifies twelve reasons why 'old-style' community investment has underperformed:[[97]](#footnote-98)97

1. Limited understanding of the often complex local context;
2. Insufficient participation and ownership by local stakeholders;
3. A perception of 'giving' rather than 'investment' *(including lack of clear objectives)*;
4. Detachment from business;
5. Responding to local requests in an ad hoc manner;
6. Lack of professionalism and business rigor;
7. Insufficient focus on sustainability;
8. Provision of free goods and services;
9. No exit or handover strategy;
10. Overemphasis on infrastructure and underemphasis on skills building;
11. Lack of transparency and clear criteria; and
12. Failure to measure and communicate results.

Regardless of the potential lack of government guidance in any given jurisdiction, it is reasonable to infer that the emergence of global goals e.g. United Nations Sustainable Development Goals and international industry guidelines of best practice, that arguably provide direction on how to achieve these goals, can resolve these limitations. However, on review of the capacity requirements and questions outlined by The World Bank[[98]](#footnote-99)98 as an example, although they consider the capabilities of a community they are focused on a specific project and/or negotiation of an agreement in relation to such a project and do not look at the community's capacity and circumstances as a whole.

**Community Capacity and the Sustainable Livelihoods Framework**

"While most consultation activities seek stakeholder feedback on key issues and project impacts to enable the company to improve its *own* actions and decision making, engagement on [community investment] must promote *stakeholder-driven* action and decision making.[[99]](#footnote-100)99 By assessing a community's capacity in its own right, without the context of a specific project, and then also engaging with a community to understand its baseline and how all of its facets interact with one another, only then can governments and industry truly collaborate with a community to determine the most effective options that will provide for mutually beneficial and sustainable energy development outcomes.

What is Community Capacity?

"United Nations Development Programme (UNDP) defines capacity development as 'the process through which individuals, organizations and societies obtain, strengthen and maintain the capabilities to set and achieve their own development objectives over time'."[[100]](#footnote-101)100 Capacity development should be "seen as a long-term process, whose outcomes may not evolve in a controlled or linear way."[[101]](#footnote-102)101 There are three levels of capacity which form an integrated system in which the levels "are mutually interactive and each level influences the other through complex co-dependency relationships"[[102]](#footnote-103)102: (1) enabling environment (policies, legislation, power relations, social norms), (2) organizational level (internal policies, arrangements, procedures, frameworks), and (3) individual level (experience, knowledge, technical skills). There are also three different types of capacity:[[103]](#footnote-104)103 (1) functional i.e. management capacities, (2) technical i.e. specific areas of expertise, specialized training, and (3) behavioural i.e. cultural shifts and changes in attitude.

Research and on the ground experience suggest that "what works is a 'best fit' rather than a 'best practice' approach that does not apply a one-size-fits-all formula but is anchored in a number of action oriented basic principles for capacity development"[[104]](#footnote-105)104:

· It makes national ownership tangible i.e. the ability to make informed choices and decisions

· It addresses power relations, mindsets and behaviour change

· It is a long-term process

· It requires sticking with the process

· It promotes a comprehensive approach i.e. linking all levels of capacity

· It looks beyond individual skills to address issues of institutional change, leadership, empowerment and public participation.

· It emphasizes the use of national systems; *It discourages stand-alone project implementation units*.

· It requires adaptation to local conditions.

· It makes the link to broader reforms; *There is little value in isolated, on-off initiatives*.

· It results in unplanned consequences that need to be valued, tracked and evaluated.

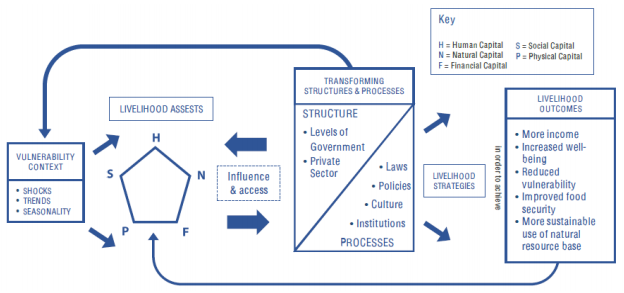
· It measures capacity development systematically.

*(Emphasis added)*

The Sustainable Livelihoods Framework

The United Nations Development Programme developed a Sustainable Livelihoods Framework that "encompasses the skills, assets (both material and social) and the approaches which will be used by individuals and communities in order to survive."[[105]](#footnote-106)105 The framework, as shown in **Figure 5** below, identifies the various factors that shape and can impact a community and it also examines how these factors interact with one another.

**Figure 5. Sustainable Livelihoods Framework**[[106]](#footnote-107)106



"The pace of renewable energy development is a political calculation and requires attention to the needs and interests served under different scenarios. As social transformations, just, democratic and ecological energy transitions demand a commitment to building community capacity for democratic energy governance while avoiding a perpetuation of the many social and ecological injustices of existing dominant energy systems."[[107]](#footnote-108)107 Due to the multi-dimensional nature of energy planning and the reality that not engaging with potentially impacted Indigenous communities is not a realistic option for energy planners or developers, by recognizing the short-comings of past engagements and investments, acknowledging Indigenous and rural communities as legitimate and valuable rights holders in energy planning and development, and also embracing a community-driven strategy to truly understand potentially impacted communities, there is a great opportunity to effect meaningful and sustainable capacity development in these communities and also achieve successful and sustainable energy development.

**CASE STUDIES re: SUSTAINABLE CAPACITY DEVELOPMENT**

**Arequipa Water Resource Management - A Peruvian Sustainability Success Story**

Arequipa, the second largest city in Peru, is located in the southern part of the country in the Atacama Desert at approximately 2,300 meters above sea level. Its dry weather, scarce rain and continuously expanding industries, such as farming and mining, make water essential for the city's development and steady population growth.

The valley where Spaniards founded Arequipa is irrigated by the Chili River. This river starts in the highlands of the Arequipa region, and its flow depends on the rains produced in the upper and medium basin. Because Arequipa originally was a farming community, dependence on water always has been recognized as a priority by the province's inhabitants and its authorities. In fact, four reservoirs were constructed between 1958 and 1992 to better regulate the water resources feeding the city and to ensure Arequipa received reliable flow for its population and productive activities.

Water governance in the Arequipa basin has always been a model in Peru. Because of the various uses of water co-existing in the province, a multi-stakeholder committee was created in 1973. It was comprised of representatives from the water utility company, or SEDAPAR, the Regional Director of Agriculture, a representative from the Technical Watering Authority of the Watering District of the Chili River (ATDR) now Local Water Authority (ALA), the Generating Company of Arequipa (EGASA), presidents from each farming district's Board of Water users, the Meteorological Service (SENAMHI), and the Freeport-McMoRan Cerro Verde Mine (Cerro Verde) - the main mining user. The committee's main objective was to review the opportunities for all users to get their water allotment despite dry years and constrained rainy seasons.

In order to meet this objective, all the users worked together to project an annual plan - based on technical information and weather forecasts - to operate the existing dams. Consumption priorities were set by then-existing laws, and users made sure they met competing needs: human consumption, farming, industry and mining as consumptive uses, and energy as a non-consumptive use. All the users agreed to respect licenses and the decisions adopted by the committee. Discharge from the system through Aguada Blanca, the regulating dam, was voted and adjusted based on consideration of all users' projected needs.

Despite these efforts and excellent coordination of the involved parties, more and more people from other provinces or regions were settling on the outskirts of Arequipa in an unplanned manner, and the water storage dams, potable water treatment plant and sewage treatment plant struggled to keep up with the continuously growing population. The regulated system of the Chili River was declared exhausted in the 1980s, preventing new users from getting water rights and existing users from adding more water to their existing licenses.

At the same time, Minero Perú, the Government entity that owned the Cerro Verde Production Unit, was working to expand its operations in order to extend its life of mine (LOM). Oxide deposits were almost exhausted and a larger concentrator was required. To continue treatment of copper sulfides and the economic development of the mine, a flotation process was added to the existing leaching facility and existing concentrator. At the time SMCV was privatized, Peru's four separate power operating systems were not interconnected, so energy was unreliable and prices were high. Better energy prices and additional water rights were needed for such effort, but no additional water rights could be granted if the Chili River regulated system still was declared exhausted. This situation was one of the reasons Minero Perú privatized Cerro Verde.

Cerro Verde attempted additional feasibility studies to expand its LOM but could not get successful results due to the aforementioned difficulties. With the formation of the Integrated Electrical National System (SEIN), energy prices and supply reliability improved, but water was still the challenge. Different alternatives were reviewed, and Cerro Verde realized the only way to get additional water rights was to regulate water being lost to the ocean year after year during rainy seasons. This excess water resource was not being stored in any of the existing dams and damaged downstream fields, causing agricultural losses to the farmers.

The Arequipa Generating Company (EGASA), a public company, and Cerro Verde worked together to co-finance and build the Pillones dam, which added 80MMC3 to the existing regulated system. The work was challenging but presented several opportunities. It was the first time a public and a private company engaged in a partnership to build public infrastructure. Although Arequipa enjoys and depends on the regulated system, companies needed to explain the benefits users would receive from the project, as well as ensure Cerro Verde obtained an enhanced water supply from the regulated system without opposition in the difficult social climate of 2002-2003.

EGASA and Cerro Verde worked together and signed a consortium contract to regulate the investment, relationship, obligations and duties of the parties. Both companies actively engaged with users and the public, communicating benefits of the Pillones dam and how all users would receive additional water rights. During the permitting process, the National Water Authority recommended that water stored at Pillones be used by EGASA and Cerro Verde. Both companies acknowledged the recommendation but decided to ensure Pillones supplied water for all users.

Before requesting its own water licenses, Cerro Verde and EGASA ensured licenses were granted to the public and farming first, and energy / mining second. The order respected the consumption priority established by the law. Once constructed and commissioned, the multi-stakeholder committee approved inclusion of the Pillones dam to the Chili River regulated system in 1996.

The Pillones dam was a successful project and supplies additional water for population consumption, farming, energy and mining uses. Because of the dam, EGASA produces approximately 13mW more energy and Cerro Verde was able to obtain the water resources needed to continue development of the larger concentrator, maintain its production and consequent tax revenue, and increase its workforce by more than 1,000 direct employees.

Pillones also set a precedent for companies to engage in similar innovative projects. EGASA and Cerro Verde signed an energy agreement, and EGASA asked Cerro Verde to build and pay for the Bamputañe dam as part of this contract. Cerro Verde built Bamputañe, adding another 40 million cubic meters of water to the regulated system.

In addition to building water storage reservoirs, Cerro Verde also advocated the construction of several transmission facilities to bring more electrical power from generation sources in the north of Peru to mining areas in the south. Technical work with the Minister of Energy and Mines, Operations Committee of the National Interconnected System (COES) and the Supervisory Committee for the Investment in Energy and Mines (OSINERGMIN ) resulted in the enhancement of the interconnected system and completion of at least two 500kV lines that now feed the southern area of the country.

The multi-stakeholder committee forum was key for the users to express their doubts and concerns, and to reach agreements. This open and transparent communication proved effective, with the committee reaching out to other entities and ministries who found in this public-private approach the solution to other problems Arequipa was facing: lack of potable water for new inhabitants and the need to treat raw domestic sewage being discharged into the river.

The additional water resources Pillones added to the system were granted to SEDAPAR to benefit the public but required treatment in a potable treatment facility. The new communities established on the outskirts of Arequipa did not have potable water, and people were buying it from water trucks, transporting it in buckets and / or receiving it for only limited hours of the day.

In consideration of this situation, national and Arequipenian regional and local authorities, social leaders, SEDAPAR and Cerro Verde agreed in 2006 that mayors would secure a site and finance construction of a wastewater treatment system. Cerro Verde agreed to finance a potable water plant or La Tomilla II.

After conducting proper feasibility studies and working together with SEDAPAR, Cerro Verde determined La Tomilla II could be built using a modular system, which would allow its expansion over 30 years as the population grew. Studies also identified that a water distribution network from the potable water plant to the north and east areas of Arequipa was needed. Cerro Verde agreed to finance these pipelines and connections for US $30 million.

La Tomilla II - named "Miguel de la Cuba Ibarra" - was officially inaugurated in July 2012, with Cerro Verde investing a total of US $120 million. The plant currently provides potable water to 350,000 people and can expand to provide 750,000 people with 24-hour access to the potable water network.

After its completion, La Tomilla II was transferred to SEDAPAR for operation and maintenance, as it is a key asset for the service this public company provides Arequipa. This is another example of how dialogue and joint work can ensure an energy project like Pillones benefits the population as well.

Despite this achievement, about 95 percent of municipal sewage continued to be released directly into the Chili River. The river is the main water source for the city and primarily is used to irrigate farmland and crops, causing concerns about levels of fecal coliform exposure for humans and livestock. Mayors who agreed to finance the critically needed sewage treatment plant encountered funding and site-selection problems.

In 2010, with mine expansion planning underway, Cerro Verde representatives, recalling an earlier suggestion by the Administrative Water Authority (AAA) and social leaders, decided to explore the possibility of using treated wastewater for mining operations. At that time, Arequipa only had the Chilpinilla Sewage Treatment Plant, which was operating at full capacity treating just 100 liters / second of municipal sewage.

Before deciding on the best water source for its expansion, several discussions took place between Cerro Verde and the Regional Government of Arequipa, the national government, SEDAPAR, farmer associations' representatives, social leaders, water and other local institutions. After a thorough analysis, all parties agreed that Cerro Verde would finance the engineering and construction of the critically needed wastewater treatment plant, christened the "La Enlozada WWTP," in exchange for the mining company to obtain one cubic meter per second in yearly average of treated water. The rest of the treated water would be returned to the river after meeting all water quality standards set by SEDAPAR. This agreement not only enabled the mine expansion to proceed but also guaranteed improved water quality of the Chili River as well as a clean water supply for the agricultural sector in the region.

Thus, Cerro Verde contributed US $540 million to the design and construction of La Enlozada WWTP - a solution to address contamination of river water that would benefit all stakeholders in the city. It was located within Cerro Verde's mining concession area to solve the location issues mayors faced before.

Although the importance of this project was acknowledged by all stakeholders, the permitting and construction process was challenging. Some downstream farmers had the perception that part of their water supply was being taken away. Other points of dispute included traffic delays caused by pipe installation and vibrations around the pump stations. All of these challenges were promptly addressed by the community relations and engineering teams, who dedicated hundreds of hours to meetings and workshops. Because of this two-way communication and transparency, the following actions were developed: enhancement of hydraulic infrastructure design, development of farming techniques, better watering technology, detour routes and stakeholder vibration monitoring. These actions resulted in approval of the Environmental and Social Assessment Study, timely completion of the WWTP and acceptance of the project as a win-win for all of Arequipa.

Cerro Verde and SEDAPAR originally agreed that SEDAPAR would operate the WWTP and Cerro Verde would pay for the treated water two years after commissioning. However, the cost of the operations and technical requirements related to the water standards caused the parties to agree that Cerro Verde would operate and maintain the plant until 2045 at an approximate annual cost of US$25 million dollars a year. In this way, SEDAPAR does not transfer any treatment cost to any user in Arequipa. Cerro Verde is currently responsible for day-to-day monitoring of the WWTP operations and any reporting mandated by the Housing Ministry and National Water Authoriy (ANA). Cerro Verde personnel work closely with SEDAPAR workers and provide training to ensure the correct operation of the WWTP. This ultimately will help ensure a smooth transition if SEDAPAR assumes responsibility for La Enlozada WWTP.

This infrastructure investment resulted in cleaner water to irrigate crops, allowing farmers to export their products, as well as improved public health, enhanced environmental quality and improved tourism by having a remediated river and better environment.

La Enlozada WWTP was commissioned in December 2015 and completed two years of operation in December 2018. It has proven to be an essential component to closing the virtuous circle of water that Cerro Verde started several years ago. Today, there is more available energy and water for all users because of additional reservoirs: the Pillones and Bamputañe dams, the San José de Uzuña dam (cofinanced with the Regional Government), potable water for 350,000 people via La Tomilla II, treated sewage via La Escalerilla WWTP (co-financed by Cerro Verde), and a cleaner Chili River via La Enlozada WWTP..

Nevertheless, the work with stakeholders is ongoing. Improvement of flumes and ditches, watering technologies, information sharing and training continues as a community relations effort.

After completing the virtuous circle of water, Cerro Verde can verify that collaborative work with water stakeholders, authorities and social leaders was key to converting its challenge to obtain additional water resources into an opportunity to achieve its business plans while helping solve Arequipa's main social challenges: additional energy and water for the public and a clean river for a better city. This transparent work allowed Cerro Verde to secure water for mining without the conflict that can result from competition for a scarce resource.

For Arequipa, the development of these initiatives has been equally positive: increased volumes of water for regional use; minimized impact of droughts; potable water for 95 percent of the population; treatment of approximately 95 percent of the city's sewage; rehabilitation of the Chili River; reduced incidents of waterborne illness; improved agricultural production and tourism; the addition of 2,800 direct jobs and 1,800 contractor employees; and enhanced tax revenue (40 percent) from expanded mining facilities - making Cerro Verde the largest copper producer in Perú.

Community and capacity building in Arequipa has proven to be a catalyst for a successful water and infrastructure development project that started out as an energy project.

**RenovAr Programme - An Argentinian Sustainable Renewable Energy Strategy**

With an estimate of 13% of the world population lacking access to electricity and approximately 3 billion without access to clean-cooking solutions[[108]](#footnote-109)108, energy has been and continues to be a major global issue and a permanent challenge. Argentina is no alien to this situation. Although according to statistics of the World Bank 100% of the Argentinian population has access to electricity[[109]](#footnote-110)109, the country has been experiencing an energetic crisis since 2010 as a consequence of years of poor policies, bids on hydrocarbons instead of alternative energies and lack of proper investments.

Argentina was part of the United Nations Assembly that adopted the Sustainable Development Agenda and the 17 Sustainable Development Goals to globally achieve by 2030, which Goal 7 is to ensure the access to affordable and clean energy while embracing an efficient utilization and increasing the share of renewable energy in the global energy mix. With that in mind, in 2016 the Argentinian government launched the RenovAr Programme, with the ambitious scope to produce 20% of electricity in the country from renewable resources by 2025. The programme entails public auctions held to support the development of private renewable energy projects through a Renewable Energy Fund created to such end and a World Bank guarantee, and was proven to be extremely successful.

Since in accordance with last national census an approximately of 2.4% of the population in Argentina is indigenous or indigenous-descent, and most of original communities are located within the Puna region in the north and the Patagonia region in the south, RenovAr took into consideration that private projects might be located in areas where indigenous communities reside and introduced a "Planning Framework for Indigenous Communities" in order to avoid any adverse effects on original population, or at least to reduce, mitigate or compensate any potential damage. In this sense, successful bidders must ensure the previous and informed consult with such population to obtain a documented support from them and to prepare a plan to help the development of the community.

One of the main purposes of the planning framework is to promote benefits and opportunities of sustainable development for indigenous communities that are in line with their culture. In this pursuit, monetary and non-monetary mechanisms might be implemented: the first implies to share a portion of the money flow generated by the project with the local community through, for example, the creation of community development funds; the latter refers to concrete actions that might be taken to ensure local communities are benefited from the project. Likewise, the planning framework states that it is expected from successful bidders to hire local workforce during the life of the project, especially in the construction stage, as a direct way to benefit local communities.

It can be asserted that renewable energy projects create significant opportunities for surrounding communities, such as hundreds or thousands of job positions and improvements in infrastructure and are also able to benefit the population by covering power needs. Some of the mechanisms to share the benefits of said projects with indigenous communities in the area include (i) hiring of local workforce; (ii) construction or improvement of roads and general infrastructure; (iii) creation of educational programmes (for example, to train locals that might lack of the necessary abilities required for the jobs offered); (iv) support to health programmes to treat any potential condition derived from the project; (v) creation of monetary funds for community development; (vi) direct investments in local enterprises and alliances with local producers or entrepreneurs.

Aside from the RenovAr Programme, an initiative linking renewable energies and original communities has been taking place in the Province of Jujuy. The state-owned company JEMSE is constructing through investments from China three solar farms in the Cauchari region to harness the strong radiations in the region, which will allow the indigenous communities to benefit from 2% of the income of the project, representing approximately USD 25,000 per year.

Argentina, like the rest of the world, is on the verge of an essential transformation in the way it produces and uses energy by switching to cleaner alternatives, especially towards overcoming the energetic crisis it has been dealing with for the past years. Besides their known environment-friendly characteristics, renewable energies have also shown potential to lead to a positive impact in sustainability and development of indigenous communities.

**The Aratirí Project *(Iron ore mine with closed-circuit pipeline)* - A Project Fail in Uruguay**

In 2006 Zamin Ferrous, an Indian company, landed in Uruguay announcing a plan to extract iron ore in an open pit in the area known as Valentines, in the Province of Treinta y Tres. Zamin's business plan was to produce 18 million tons of iron concentrate, per year, for a period of 20 to 30 years. Initial investment was estimated in USD 3,000 million and the average annual export was expected to be USD 1,400 million. The project included the construction of a close circuit pipeline that would conduct the ore in water from the site directly to a new port to be built to be loaded on ships, with the water then returning back to the site. Electricity consumption was calculated in approx. 192 MW and 5 new high voltage lines needed to be constructed.[[110]](#footnote-111)110

The project never took off (the exploitation agreement was never signed) and in 2018, Zamin Ferrous initiated an arbitration procedure against Uruguay. Although the contents of the demand have been classified as confidential, it has been informed that the demand is for USD 3,536 million and based on breach of investment protection treaties and a change in rules by the country.[[111]](#footnote-112)111

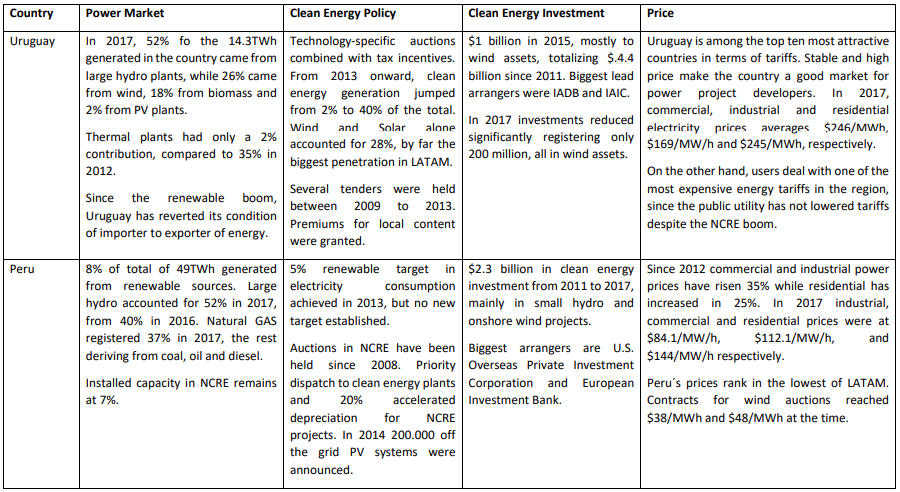
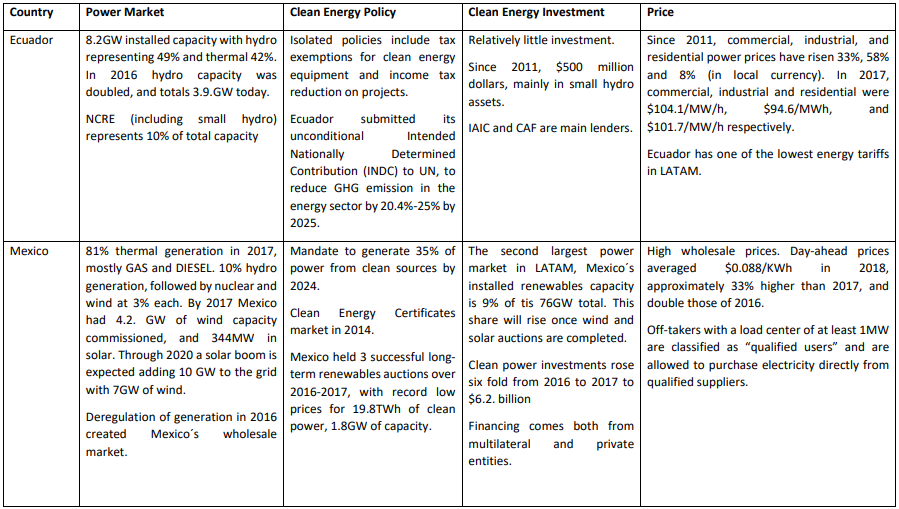
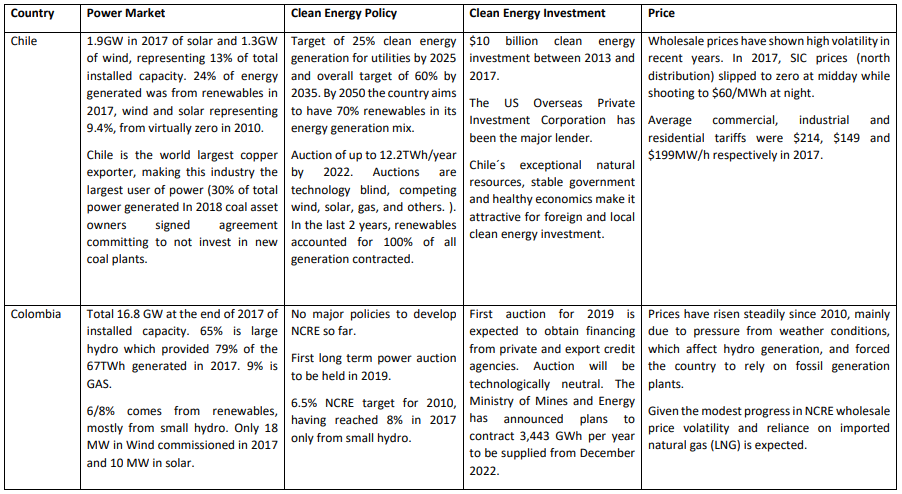
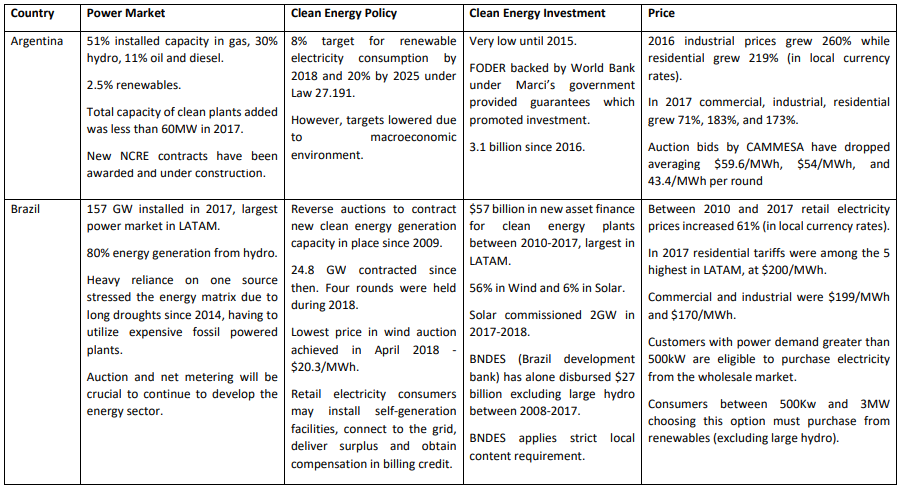
The "Aratirí Project" as it is locally known, was a new, groundbreaking project. During almost the same period of time, another groundbreaking project was taking place: the energy sector was also transforming. In 2005 wind farms did not exist in Uruguay, but by 2015 the country had an installed capacity of wind energy of 580MW.[[112]](#footnote-113)112 <COD Comment - Was this one major project or the sum of several smaller projects?> Understanding the factors that cause one project to fail and the other to succeed is of course complex and by no means the purpose of this paper. However, it is interesting to review the rural community reaction to both projects.

Uruguay is an agricultural country and its rural communities and agricultural producers are fierce defenders of their activity and their way of life and have traditionally opposed any activity that they consider to disturb or affect them, even forestry activities. However, rural landholders embraced the arrival of renewable energy projects with no major oppositions. Both activities coexist and the country has become used to the new rural landscape of wind farms, solar panels, cattle and crops. On the other hand, several communities and social organizations raised their voice against Aratirí, some of them even demanding that the Uruguayan constitution needed to be amended to simply prohibit metal large scale mining in open pits in the whole country.[[113]](#footnote-114)113 At the risk of oversimplifying, it is believed that probably two of the main causes of such opposite reaction were related to the environmental aspect and the direct economic effect of each activity on communities.

The public understood and accepted renewable energy as an environmental friendly activity. The set of rules for environmental requisites for projects were clear and information was transparent. Private land use agreements were signed between developers with landholders at a relatively standard rate that implied a good economic turn for landowners that helped counterbalance agricultural income fluctuations. The public was aware that payment under the PPAs were guaranteed by the State. The expectation was that with the new supply, electricity rate (extremely high in the country) would lower and in turn productivity would increase. And in certain cases the development of these alternative energy sources actually helped to provide electricity to remote areas.

In contrast, the public announcement of the arrival of Zamin, created a political turmoil that caused parliament to pass a law specifically regulating large scale mining, a concept practically unheard of before. Defenders of the law stated it guaranteed best environmental practices and better returns for the State and for landholders. Detractors defined it as a tailored-made law designed to benefit Zamin, passed without enough technical assistance and pointed out that the royalty for landowners was capped. Negotiations between Zamin and the State were mostly kept confidential and public information was ambiguous: the company stated that all environmental studies had been carried out and that permits were requested while the State claimed that they could not sign an exploitation agreement because environmental aspects required were not met. Meanwhile, request for easements were filed by the Company with landowners, in turn, filing oppositions. It could be concluded that there was no clear incentive for the affected communities to embrace this project, except maybe for increased employment. A question remains: would things have turned out differently if the State and the company had jointly adopted a more slow-paced, transparent and coordinated approach to public information such as the renewable projects did?

**ANNEX 1: SELECTED COUNTRY ANALYSIS FROM BLOOMBERG'S CLIMATESCOPE**.



Proceedings of the Rocky Mountain Mineral Law Foundation Annual and Special Institutes

Copyright © 2024 ROCKY MOUNTAIN MINERAL LAW FOUNDATION.

All Rights Reserved.

**End of Document**

1. 1The Secretary-General's Advisory Group on Energy and Climate Change (AGECC), Energy for a Sustainable Future Report and Recommendations (2010), http://www.un.org/millenniumgoals/pdf/AGECCsummaryreport[1].pdf at7. [↑](#footnote-ref-2)
2. 2Carlos Battle, "Analysis of the impact of increased Non-Conventional Renewable Energy generation on Latin American Electric Power Systems. Tools and Methodologies for assessing future operation, planning and Expansion" IBD -DP-341, page 6. [↑](#footnote-ref-3)
3. 3Renewable Energy Market Analysis 2016. Latin America. Published by IRENA - International Renewable Energy Agency, page 3. . [↑](#footnote-ref-4)
4. 4Farah Abi Morshed and Marijke Zewuster. Energy Monitor. Abn Amro Bank. Renewable energy in Latin America. https://insights.abnamro.nl/en/2018/05/energy-monitor-renewable-energy-in-latin-america/ [↑](#footnote-ref-5)
5. 5IRENA. Op. Cit. page 10. [↑](#footnote-ref-6)
6. 6IRENA. Op. Cit page 12 and onwards. [↑](#footnote-ref-7)
7. 7IRENA. Op. Cit page 10. [↑](#footnote-ref-8)
8. 8Carlos Battle, Op. Cit., page 11 [↑](#footnote-ref-9)
9. 9Georges Romano. The Rise of Renewables in Latin America, page 14. CITIBANK. www.gtreview.com [↑](#footnote-ref-10)
10. 10Georges Romano. Op. Cit. page 15. [↑](#footnote-ref-11)
11. 11Carlos Battle, Op. Cit, page 12 [↑](#footnote-ref-12)
12. 12IBD Project CH-L1069 published in "Innovations Live" in http://iadb.libguides.com/c.php?g=199071 [↑](#footnote-ref-13)
13. 13Nancy McCarthy, Heath Henderson. "The Role of Renewable Energy Laws in Expanding Energy from Non-Traditional Renewables". IBD Working Paper Series No IDB - WP - 540. [↑](#footnote-ref-14)
14. 14Georges Romano. Op. Cit page 15. [↑](#footnote-ref-15)
15. 15Nancy McCarthy, Heath Henderson. "The Role of Renewable Energy Laws in Expanding Energy from Non-Traditional REnewables". IBD Working Paper Series No IDB - WP - 540. [↑](#footnote-ref-16)
16. 16Georges Romano. Op. Cit page 15. [↑](#footnote-ref-17)
17. 17Renewables 2018. Global Status Report. Renewables Energy Policy Network for the 21st Century. REN 21, pages 37, 40. 45 [↑](#footnote-ref-18)
18. 18Business Empresarial. Proyecto de electricidad con paneles solares de Ergon Perú beneficiará a más de 600 mil personas de zonas y localidades aisladas del Perú al culminar sus operaciones en el 2019, http://www.businessempresarial.com.pe/proyecto-de-electricidad-con-paneles-solares-de-ergon-peru-beneficiara-a-mas-de-600-mil-personas-de-zonas-y-localidades-aisladas-del-peru-al-culminar-sus-operaciones-enel-2019/ [↑](#footnote-ref-19)
19. 19Ídem. [↑](#footnote-ref-20)
20. 20Rumbo Minero. MEM: Ergon Perú instala más de 80 mil paneles solares en zonas rurales del Perú, septiembre 2018, http://www.rumbominero.com/noticias/energia/mem-ergon-peru-instala-mas-de-80-mil-paneles-solares-en-zonas-rurales-del-peru/ [↑](#footnote-ref-21)
21. 21Business Empresarial. Óp. cit. [↑](#footnote-ref-22)
22. 22Gestión. Petramás abre central térmica de biomasa con una inversión de US$14 mlls., 28 octubre 2011, https://archivo.gestion.pe/noticia/1324989/petramas-abre-central-termica-biomasa-inversion-us-14-mlls [↑](#footnote-ref-23)
23. 23Organismo Superior de la Inversión en Energía y Minas (OSINERGMIN). Central Termoeléctrica Huaycoloro, https://www.osinergmin.gob.pe/seccion/centro\_documental/electricidad/Documentos/PROYECTOS%20GFE/Acorde%C3%B3n/Generaci%C3%B3n/1.5.1.pdf [↑](#footnote-ref-24)
24. 24La República. Iniciaron operaciones de la primera central térmica de biomasa, 29 octubre 2011, https://larepublica.pe/economia/585986-iniciaron-operaciones-de-la-primera-central-termica-de-biomasa [↑](#footnote-ref-25)
25. 25Organismo Superior de la Inversión en Energía y Minas (OSINERGMIN). Óp. Cit. [↑](#footnote-ref-26)
26. 26Sistema Peruano de Informática Jurídica. Resolución Directoral No 248-2011-GRL-GRDE-DREM: Otorgan concesión definitiva de generación con recursos energéticos renovables de la Central Térmica Huaycoloro y aprueban minuta del contrato de concesión a suscribirse con PETRAMAS S.A.C., pág.18 octubre 2011, http://spij.minjus.gob.pe/normas/textos/201011T.pdf at page 88 [↑](#footnote-ref-27)
27. 27http://global-climatescope.org/ [↑](#footnote-ref-28)
28. 28World Commission on Environment and Development document "Our Common Future", Part 1, 2 I. http://www.un-documents.net/ocf-02.htm#I [↑](#footnote-ref-29)
29. 29"Mapping the ***oil*** and gas industry to the Sustainable Development Goals: An Atlas" http://www.undp.org/content/undp/en/home/librarypage/poverty-reduction/mapping-the-***oil***-and-gas-industry-to-the-sdgs-an-atlas.html [↑](#footnote-ref-30)
30. 30https://www.un.org/sustainabledevelopment/sustainable-development-goals/ [↑](#footnote-ref-31)
31. 31https://www.th-energy.net/english/platform-renewable-energy-and-mining/developments/ [↑](#footnote-ref-32)
32. 32Yosoon Choi, Chaeyoung Lee & Jinyoung Song, "Review of Renewable Energy Technologies Utilized in the ***Oil*** and Gas Industry," 7(2) *International Journal of Renewable Energy Research* 592 (2017) at 592. [↑](#footnote-ref-33)
33. 33Jason Switzer, Dave Lovekin & Kelly Finigan, "Renewable energy opportunities in the ***oil*** and gas sector, Executive Summary," The Pembina Institute, January 2013 at 1. [↑](#footnote-ref-34)
34. 34*Id.* at 2. [↑](#footnote-ref-35)
35. 35*Id.* at 4, Figure 3. [↑](#footnote-ref-36)
36. 36*Id.* at 1. [↑](#footnote-ref-37)
37. 37*Id.* at 3. [↑](#footnote-ref-38)
38. 38https://www.leychile.cl/Navegar?idNorma=1055402 [↑](#footnote-ref-39)
39. 39http://global-climatescope.org/results [↑](#footnote-ref-40)
40. 40https://www.bloomberg.com/news/features/2018-08-07/these-massive-renewable-energy-projects-are-powering-chilean-mines [↑](#footnote-ref-41)
41. 41https://www.barrick.com/news/news-details/2018/zaldivar-goes-for-100-percent-renewable-electricity/default.aspx [↑](#footnote-ref-42)
42. 42https://energyandmines.com/2018/04/goldcorp-contracts-genneia-to-provide-renewable-energy-to-argentinian-subsidiary-oroplata-sa/ [↑](#footnote-ref-43)
43. 43György Csomós, "Relationship Between Large ***Oil*** Companies and the Renewable Energy Sector," 13(11) *Environmental Engineering and Management Journal* 2781(2014) at 2786. [↑](#footnote-ref-44)
44. 44Switzer, *supra* note 33 at 2. [↑](#footnote-ref-45)
45. 45https://www.mining-technology.com/news/report-suggests-renewable-energy-will-become-vital-mining-companies/ [↑](#footnote-ref-46)
46. 46https://www.ijrer.org/ijrer/index.php/ijrer/article/view/5460/pdf [↑](#footnote-ref-47)
47. 47https://www.eni.com/en\_IT/innovation/technological-platforms/bio-refinery/green-diesel.page [↑](#footnote-ref-48)
48. 48https://www.riotinto.com/ourcommitment/spotlight-18130\_19357.aspx [↑](#footnote-ref-49)
49. 49http://www.sandfire.com.au/operations/degrussa/solar-power-project.html [↑](#footnote-ref-50)
50. 50Choi, *supra* note 32 at 593-595. [↑](#footnote-ref-51)
51. 51Switzer, *supra* note 33 at 3. [↑](#footnote-ref-52)
52. 52https://www.ucsusa.org/clean-energy/renewable-energy/barriers-to-renewable-energy [↑](#footnote-ref-53)
53. 53Neil Hirst & Antony Froggat, "The Reform of Global Energy Governance," Grantham Institute for Climate Change Discussion paper No 3, December 2012 at 1. [↑](#footnote-ref-54)
54. 54Farzad Rahimi Mougouei & Mahdieh-Sadat Mortazavi, "Effective Approaches to Energy Planning and Classification of Energy Systems Models," 7(2) *International Journal of Energy Economics and Policy* 127 (2017) at 128. [↑](#footnote-ref-55)
55. 55Hirst, *supra* note 53 at 7. [↑](#footnote-ref-56)
56. 56*Id.* at 5. [↑](#footnote-ref-57)
57. 57Marcus Lange, Anne Marie O'Hagan, Robert R.N. Devoy, Martin Le Tissier & Valerie Cummins, "Governance barriers to sustainable energy transitions - Assessing Ireland's capacity towards marine energy futures," 113 *Energy Policy* 623 (2018) at 624. [↑](#footnote-ref-58)
58. 58*Id.* at 624. [↑](#footnote-ref-59)
59. 59*Id.* at 624. [↑](#footnote-ref-60)
60. 60Roberto Paredes. Contribution of variable renewable energy to increase energy security in latin America. IDB. www.iadb.org [↑](#footnote-ref-61)
61. 61El Observador newspaper. https://www.elobservador.com.uy/nota/uruguay-aprovecha-ola-de-calor-en-la-region-y-vende-energia-a-argentina-y-brasil-201912917588 [↑](#footnote-ref-62)
62. 62Lange, *supra* note 57 at 624. [↑](#footnote-ref-63)
63. 63Arthur Benz, "Market Regulation and Multilevel Governance. The German Approach to Promote Green Energy," (2018), https://carleton.ca/caneunet/wp-content/uploads/Policy-Brief-Market-Regulation-and-Multilevel-Governance-by-Benz-Nov-2018-Canada-EU-Network-v2.pdf at 2. [↑](#footnote-ref-64)
64. 64Lange, *supra* note 57 at 624, Figure 1. [↑](#footnote-ref-65)
65. 65Matthew S. Winters & Matthew Cawvey, "Governance Obstacles to Geothermal Energy Development in Indonesia," 34(1) *Journal of Current Southeast Asian Affairs* 27 (2015) at 30. [↑](#footnote-ref-66)
66. 66Katherine Wheatley, "***Oil*** Sands Energy Governance: An Ethnography on Negotiating Development and Indigenous Rights in Northern Alberta," A Thesis Submitted to the College of Graduate and Postdoctoral Studies in Partial Fulfillment of the Requirements for the Degree of Master of Arts in the Department of Archaeology and Anthropology University of Saskatchewan, Saskatoon (2018) at 25. [↑](#footnote-ref-67)
67. 67*Id.* at 28. [↑](#footnote-ref-68)
68. 68Bregje Van Veelen, "Negotiating energy democracy in practice: governance processes in community energy projects," 27(4) *Environmental Politics* 644 (2018) at 644. [↑](#footnote-ref-69)
69. 69Matthew J. Burke & Jennie C. Stephens, "Political power and renewable energy futures: A critical review," 35 *Energy Research & Social Science* 78 (2018) at 78-79. [↑](#footnote-ref-70)
70. 70Lange, *supra* note 57 at 624. [↑](#footnote-ref-71)
71. 71https://sustainabledevelopment.un.org/?menu=1300 [↑](#footnote-ref-72)
72. 72Serenella Sala, Biagio Ciuffo & Peter Nijkamp, "A systemic framework for sustainability assessment," 119 *Ecological Economics* 314 (2015) at 318. [↑](#footnote-ref-73)
73. 73*Id.* [↑](#footnote-ref-74)
74. 74*Id* at 319. [↑](#footnote-ref-75)
75. 75*Id* at 318. [↑](#footnote-ref-76)
76. 76*Id* at 320. [↑](#footnote-ref-77)
77. 77*Id.* at 321, Figure 2. [↑](#footnote-ref-78)
78. 78Daniel Franks, "Social impact assessment of resource projects," International Mining for Development Centre, Mining for Development: Guide to Australian Practice (2012), https://www.csrm.uq.edu.au/media/docs/167/Social\_Impact\_Assessment\_of\_Resource\_Development\_Projects\_Franks\_2012.pdf at 8. [↑](#footnote-ref-79)
79. 79OECD. Linking renewable energy to rural develpment.www.oecd.org [↑](#footnote-ref-80)
80. 80Renewable Energy Market Analysis 2016. Latin America. Published by IRENA - International Renewable EnergyAgency. Page 150. [↑](#footnote-ref-81)
81. 81Renewable Energy Market Analysis 2016. Latin America. Published by IRENA - International Renewable EnergyAgency. Page 150. [↑](#footnote-ref-82)
82. 82OECD. Linking renewable energy to rural develpment.www.oecd.org [↑](#footnote-ref-83)
83. 83Caroline O'Driscoll & John Coloso, "Development of an Analytical Tool to Assess a Community's Sustainable Energy Needs," A Research Project submitted in partial fulfillment of the requirements for the Degree of Master of Science, Graduate Program in Sustainable Energy Development, University of Calgary (2018) at 19. [↑](#footnote-ref-84)
84. 84The World Bank, Mining Community Development Agreements Source Book March 2012, http://siteresources.worldbank.org/INTOGMC/Resources/mining\_community.pdf at 6. [↑](#footnote-ref-85)
85. 85International Finance Corporation (IFC), Strategic Community Investment - A Good Practice Handbook for Companies Doing Business in Emerging Markets (2010), https://www.ifc.org/wps/wcm/connect/f1c0538048865842b50ef76a6515bb18/12014complete-web.pdf?MOD=AJPERES at 14. [↑](#footnote-ref-86)
86. 86The World Bank, *supra* note 84 at 9. [↑](#footnote-ref-87)
87. 87*Id.* at 5; See also EI SourceBook, Good Practice Note Community Development Agreements 2011, http://www.eisourcebook.org/cms/files/csrm\_good\_practice\_notes\_on\_cdas\_document\_final\_260911.pdf at 1. [↑](#footnote-ref-88)
88. 88Maria S. Tysiachniouk & Andre N. Petrov, "Benefit sharing in the Arctic energy sector: Perspectives on corporate policies and practices in Northern Russia and Alaska," 39 Energy Research & Social Science 29 (2018) at 30. [↑](#footnote-ref-89)
89. 89*Id.* at 30. [↑](#footnote-ref-90)
90. 90*Id.* at 31. [↑](#footnote-ref-91)
91. 91*Id.* [↑](#footnote-ref-92)
92. 92*Id.* [↑](#footnote-ref-93)
93. 93Keith Storey, "Fly-in/Fly-out: Implications for Community Sustainability," 2 *Sustainability* 1161 at pg.1175. [↑](#footnote-ref-94)
94. 94*Id.* at 1175. [↑](#footnote-ref-95)
95. 95*Id.* at 1171. [↑](#footnote-ref-96)
96. 96Jennifer Loutit, Jacqueline Mandelbaum and Sam Szoke-Burke, "Emerging Practices in Community Development Agreements," Columbia Center on Sustainable Investment (2016), http://ccsi.columbia.edu/files/2016/02/Emerging-practices-in-CDAs-Feb-2016-sml.pdf at 2. [↑](#footnote-ref-97)
97. 97IFC, *supra* note 85 at 1-2. [↑](#footnote-ref-98)
98. 98The World Bank, *supra* note 84 at 35. [↑](#footnote-ref-99)
99. 99IFC, *supra* note 85 at 37. [↑](#footnote-ref-100)
100. 100United Nations Development Programme (UNDP), UNDP Capacity Development Practice Note, October 2008, http://content-ext.undp.org/aplaws\_publications/1449053/PN\_Capacity\_Development.pdf at 4. [↑](#footnote-ref-101)
101. 101*Id.* at 5. [↑](#footnote-ref-102)
102. 102*Id.* at 6. [↑](#footnote-ref-103)
103. 103EI SourceBook, *supra* note 87 at 15; See also UNDP (2008), *supra* note 100 at 12. [↑](#footnote-ref-104)
104. 104UNDP (2008), *supra* note 100 at 7. [↑](#footnote-ref-105)
105. 105United Nations Development Programme, Guidance Note - Application of the Sustainable Livelihoods Framework in Development Projects (2017), http://www.latinamerica.undp.org/content/rblac/en/home/library/poverty/guidance-note-application-of-the-sustainable-livelihoods-framew.html at 2. [↑](#footnote-ref-106)
106. 106*Id.* at 2, Figure 1. [↑](#footnote-ref-107)
107. 107Burke, *supra* note 69 at 90. [↑](#footnote-ref-108)
108. 108According to United Nations statistics. https://www.un.org/sustainabledevelopment/energy/ [↑](#footnote-ref-109)
109. 109World Bank Open Data: https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS [↑](#footnote-ref-110)
110. 110"La investigación geológica que transformará Uruguay" Zamin FerrousNewsletter; "Yacimientos para impulsar el desarrollo de un país", Zamin Ferrous Newsletter; "El mayor proyecto productivo, industrial y logístico de la historia del Uruguay", Zamin Ferrous Newsletter [↑](#footnote-ref-111)
111. 111"Gobierno declaró confidencial información relativa a la demanda de Aratirí" El Observador, Sept. 25, 2018 [↑](#footnote-ref-112)
112. 112"Cómo Uruguay logró ser el país con mayor porcentaje de energía eólica de América Latina", Alejandra Martins, BBC Mundo, 14 March 2016 [↑](#footnote-ref-113)
113. 113"Aratirí es una propuesta perdedora, dijo el vocero del Movimiento anti minería", www.todoelcampo.com.uy. 03 March 2014 [↑](#footnote-ref-114)