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China and Argentina: Investments, Energy and Sustainability. The Cauchari Solar Park Project

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IISCAL envisions a time when Chinese companies and investors in Latin America and globally abide by best environmental and social practices and are held accountable by an active and engaged civil society and local governments. IISCAL conducts research, raises awareness, develops advocacy tools, and promotes collaboration among NGOs in Latin America, China and internationally. IISCAL's work relies primarily on making Chinese environmental and social guidelines accessible and deployable by local stakeholders. IISCAL was established in October of 2014 under the sponsorship of the Program on International and Comparative Environmental Law at American University Washington College of Law, and since October 2016 IISCAL has been hosted by the Bank Information Center (BIC) in Washington DC.

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INTRODUCTION

In 2004, the Argentine media reported with skepticism the first economic cooperation agreements between Chinese authorities and the government of Néstor Kirchner, raising doubts about the results of the meeting. Few imagined back then that China would become one of the government's main trading and financial partners in just a decade. Between 2007 and 2017, China lent US$ 29.4 billion to the Argentine government for projects mainly concentrated in the transport and energy sectors. During the presidency of Mauricio Macri, Chinese investment in energy entered the field of renewable energies, an important turning point with respect to the investments in fossils and mega hydroelectric plants during the previous government.

This article analyzes the bilateral political and economic relationship between Argentina and China and seeks to shed light on Chinese investments in the Argentine energy sector. Special attention is given to the Cauchari Solar Energy Park project, which represents the largest photovoltaic solar plant in Latin America and the Caribbean - financed by the China Eximbank and built by Shanghai Electric Power Construction – and which is the most promising hope to promote the redirection of Chinese financing towards a sustainable energy transition.

BILATERAL RELATIONS BETWEEN ARGENTINA AND CHINA

Evolution and key aspects

On 19 February, 1972, China and Argentina established diplomatic relations, and in 1977, the two countries signed their first trade agreement. The de facto president Jorge Rafael Videla was the first president to visit China in 1980, and took the opportunity to sign the first agreement on economic cooperation. After the return of democracy to Argentina in 1983, relations between both countries were not affected. On the contrary, they continued to grow on several fronts. Although Raúl Alfonsín's new government paid great attention to issues of human rights, Argentina opted for a policy of non-interference in the internal affairs of China. In 1990, President Yang Shangkun was the first Chinese president to visit Argentina.

Although the relationship with China was active from the beginning, it was further strengthened during the Kirchner governments (2003-2015), similarly to other countries' experiences in the LAC region during the last decade. At the beginning of Néstor Kirchner's government it was feared that his human rights advocacy background was going to affect the bilateral relationship, but the policy of non-interference continued in the case of China. After the deterioration of bilateral relations with the United States

and after losing access to international credit markets for defaulting on the payment of nearly US$ 100 billion in bonds[1], Chinese banks became Argentina's main lenders. Alongside this, the Kirchners' foreign policy of allying with the ALBA bloc (Bolivarian Alliance for the Peoples of Our America)[2] further strengthened the relationship with China and the distancing of traditional lenders.

Argentina has signed a total of 176 agreements with China, more than half during the last decade.

During the presidency of Néstor Kirchner, 20 agreements were signed with China.

Table I

Agreements signed between China and Argentina (1947 - 2018)

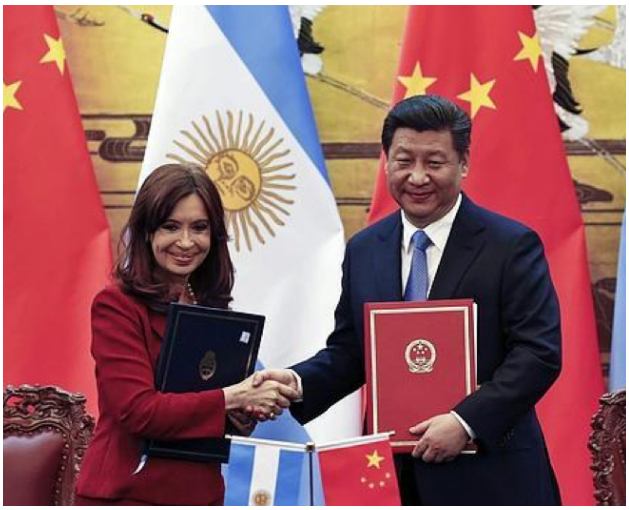
PRESIDENCY	PRESIDENTIAL PERIOD	AGREEMENTS
Juan Domingo Perón	1947	1
Jorge Videla/ Eduardo Viola/ Leopoldo Galtieri/ Reynaldo Bignone (de factos)	03/1976 to 12/1983	16
Raúl Alfonsín	12/1983 to 07/1989	15
Carlos Menem	07/1989 to 12/1995	12
Fernando de la Rúa/ Adolfo Rodríguez Saá/ Eduardo Duhalde	12/1989 to 05/2003	22
Néstor Kirchner	03/2003 to 12/ 2007	20
Cristina Fernández de Kirchner	12/ 2007 to 12/2015	60
Mauricio Macri	12/2015 to 12/2018	40

Source: Own elaboration with data from the Digital Library of Treaties, Argentine Chancellery.

1. "Cronología de la deuda argentina". El Mundo. 2010. Available on: https://www.elmundo.es/america/2010/06/23/argentina/1277310922.html
2. ALBA is made up of the following countries: Antigua and Barbuda, Bolivia, Cuba, Dominica, Grenada, Nicaragua, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Venezuela.

In 2010, President Cristina Kirchner made her first trip to Beijing, during which several agreements were signed, aiming at creating an environment conducive to strengthening bilateral coordination in political, legislative, judicial and cultural affairs, but also to consolidate commitments and create dialogue and coordination mechanisms on infrastructure, energy and mining[3]. In July 2014, during President Xi Jinping's first visit to Argentina, another 20 agreements were signed. Two key agreements were the "Framework Agreement for Cooperation in Economic and Investment Matters between the Government of the Argentine Republic and the Government of the People's Republic of China" (ratified by the National Congress of Argentina through the 27,122 law in an express session in March 2015[4]) and also the upgrade from "Strategic Association" established in 2004 to "Integral Strategic Association"[5]. Both instruments opened a range of opportunities for Chinese investors and companies in the areas of infrastructure, energy, oil and mining. Interestingly, the projects of the Cóndor Cliff - La Barrancosa dams and the Belgrano Cargas rail project, whose feasibility study had already been negotiated with China in 2004, also appear in the document of the Integral Strategic Association. The dams project, due to its negative environmental and economic implications, would later constitute a high point with China for the new Argentine government.

Image I
Cristina Kirchner´s visit to China, 2014



Source: Xinhuanet

In 2015, a few months before leaving office, President Cristina Kirchner signed another round of agreements with China. Among them was a nuclear cooperation agreement that envisaged the construction of Argentina's fourth nuclear power plant for an initial amount of US$ 5,994 million. The Argentine government also opened the possibility for Chinese state corporations to exploit deposits of lithium, copper and potash (the extraction of this last mineral would be to replace the Brazilian company Vale that abandoned operations in the province of Mendoza). However, the most controversial agreement for Argentines was the authorization for the construction of a scientific base for the exploration of space that is administered by Chinese military personnel

3. Joint Declaration between the People's Republic of China and the Argentine Republic. Available on: https://www.fmprc.gov.cn/esp/wjdt/gongbao/t717906.shtml Last access: 9 March 2019.
4. Article V of Law 27.122 laid the foundations for joint infrastructure projects, including this controversial part: "Acquisitions within the framework of Argentine public-sector projects (...) can be carried out through directly provided they are subject to concessional financing from the Chinese side and that the financing is made under advantageous conditions of quality and price ". This article authorized the executive branch to negotiate future contracts with China without the authorization of Congress, an unprecedented event in Argentine public procurement.
5. Joint declaration on the establishment of the Integral Strategic Partnership between the Argentine Republic and the People's Republic of China. Available in the treaty library of the Ministry of Foreign Affairs of Argentina. Available on: www.tratados.cancilleria.gob.ar

in Argentine Patagonia[6]. The concession was granted for 50 years and only personnel authorized by Beijing have access to the facilities.

Shortly after taking office on December 2015, new president Mauricio Macri announced the suspension of some projects signed during the government of Cristina Kirchner, which created impasses with China. Among them, Macri decided to review the construction of the Cóndor Cliff - La Barrancosa dams due to its high cost per MW/h compared to other options for generating electricity (e.g.: significantly greater than electricity produced by wind power). In addition, the dams had been strongly criticized by national and international environmental organizations, and by indigenous communities due to the serious environmental impacts that the project entailed, including the flooding of more than 47,000 hectares of pristine land and the potential impact on the Perito Moreno Glacier. When Macri announced his decision to review the projects, Chinese banks had already made disbursements of US$ 950 million. In response, Beijing announced that it would activate the cross-default clause of the contract (a condition not very common in loan contracts with China in LAC). Activating the cross-default clause meant that Argentina would also lose funding for the railway project and assume the economic penalties for not executing the loans for both projects, the immediate return of already disbursed contributions plus fines for non-compliance, the loss of 1,500 jobs, and in the words of the Development Bank of China "put at risk the win-win relationship" between both countries[7]. Coincidentally, but not surprisingly, in 2016, China practically suspended the importation of Argentine soybean oil, and according to the Ministry of Agribusiness, an export agreement on the sale of meat has been frozen since the suspension of the dam project. The Supreme Court of Justice of Argentina also ruled against the dams, temporary suspending the project until a new Environmental Impact Assessment (EIA) is presented and a public hearing is held in accordance with national legislation.

Image II
Chinese base in Argentine Patagonia

Source: www.losandes.com.ar

In April 2017, President Mauricio Macri traveled to China to attend the Third Strategic Dialogue for Economic Cooperation and Coordination. A priority issue during the dialogue meetings was to renegotiate the size of the dams[8], since suspending the

6. "Los secretos de la base china de la Patagonia que preocupa a Estados Unidos, según el New York Times". Clarín. July 2018. Available on: https://www.clarin.com/mundo/secretos-base-china-patagonia-preocupa-unidos-new-york-times_0_BkweAOoEX.html Last access: 9 March 2019.
7. Fragments of the letter were published by La Nación on 13 April 2016. Available on: https://www.lanacion.com.ar/1888726-que-pasa-si-macri-modifica-acuerdos-internacionales Last access: 9 March 2019.
8. The dams will produce less electricity than initially planned by the previous government: it will be reduced to 1,290 MW of power, from the 1,760 MW originally contemplated.

Table II
Main agreements signed between China and Argentina

AGREEMENT	YEAR	STATUS	BRIEF DESCRIPTION
Treaty of Friendship	1947	Active	Establishment of the bases of the bilateral relationship.
Economic cooperation	1980	Expired	Facilitate the action of corporations in agriculture, livestock, fisheries, forestry, exploitation of oil, gas, coal, food industry, petrochemical, medicine, naval, steel, road, rail, port, among others.
Agreement for the Promotion and Reciprocal Protection of Investments	1994	Expired	Promote investments of the other Contracting Party in accordance with laws and regulations. Facilitate the obtaining of visas and work permits for investors of the other Contracting Party in relation to the activities associated with such investments.
Memorandum on Cooperation in Trade and Investment	2004	Active	Promote the development of infrastructure, housing, energy, agriculture, basic industries, telecommunications, mining, and other sectors of mutual interest for which Chinese institutions would provide financing.
Letter of Intent on Hydrocarbon Activities	2004	Expired	Cooperation in the hydrocarbon and gas sectors. The Argentine company Energía Argentina Sociedad Anónima (ENARSA) and CHINA SONANGOL are committed to exploring possible joint projects.
Memorandum on Cooperation in Railway Activities	2004	Expired	Promote the Argentine railway system, including the feasibility study of the Belgrano Cargas railway project, and the construction of the bi-oceanic corridors.
Letter of Intent on Cooperation in the Works of the Road and the Black Water Tunnel	2004	Active	Construction of a tunnel in the Province of San Juan in Argentina that connects with the IV Region of the Republic of Chile.

AGREEMENT	YEAR	STATUS	BRIEF DESCRIPTION
Memorandum on Cooperation in the Field of Forest Resources and Environmental Protection	2009	Active	Strengthen exchange and cooperation in the area of natural forests, wetlands, nature reserves, fire control and desertification.
Memorandum on Agricultural Cooperation	2009	Expired	Cooperate for the formulation of laws for agricultural trade, policies, research, agricultural and livestock production, environmental protection, biofuels, biotechnology, etc.
Memorandum on Cooperation in Mining	2009	Active	Exchange, training and promotion of projects.
Joint Action Plan for Agricultural Cooperation	2012	Expired	Deepen cooperation in agriculture and develop the complementary advantages of the parties, such as market demand, variety of products, industrial characteristics, capital and technology. The Plan also includes a process of agricultural modernization, safeguarding global food security and promoting the sustainable development of agriculture.
Joint Action Plan 2014-2018	2014	Expired	Define goals for cooperation and various coordination instruments for the execution of projects and programs. Deepen the strategic partnership and complementarity of both countries with added value, covering issues of foreign policy, social, industrial, cultural, transport, mining and even environmental (including issues of circular economy and climate change).
Cooperation Agreement for the Establishment and Operation of a China Station in the Province of Neuquén.	2014	Valid for 50 years and may be extended.	The facilities will be built and operated by China in order to provide ground support to the exploration missions of the far space.

AGREEMENT	YEAR	STATUS	BRIEF DESCRIPTION
Framework Agreement for Economic Cooperation and Investments	2014	Active	Strengthen and promote commercial and investment links between private and public companies of both countries, with special emphasis on the industrial and infrastructure sectors.
Establishment of the Integral Strategic Association	2014	Active	Cooperation in energy, mining, manufacturing, agriculture, monetary swap renovation, trade, infrastructure in transport and electricity. In 2015, a new agreement was signed to strengthen cooperation and once again the execution of the Belgrano Cargas and the Kirchner-Cepernic dams was confirmed.
Agreement for cooperation in the peaceful uses of nuclear technology	2015	Active	The agreement contemplates research and cooperation in nuclear safety, as well as establishing the framework for the design, construction, operation and maintenance of nuclear power plants.
Strategic Action Plan for Agricultural Cooperation	2017	Active	Define the areas of cooperation and bilateral development, including biotechnology, seeds, fisheries, scientific research, animal health, dairy, equestrian industry, among other.
Cooperation in the Field of Protection and Conservation of the Environment and Sustainable Development	2018	Active	Exchange of information and technology; visits by experts, academics and delegations; capacity development; seminars organized jointly, promotion of public-private partnerships; and tackling climate change.
Supplementary Agreement to the Bilateral Currency Swap Agreement	2018	Active	Extension of the existing SWAP by 60 billion yuan, at the request of the Central Bank of Argentina to guarantee financial stability.
Memorandum to Strengthen Fiscal and Financial Cooperation	2018	Active	Expand financial cooperation, including within the framework of the Silk Road. Financially support infrastructure projects, production capacity, investment and commercial cooperation. Promote

AGREEMENT	YEAR	STATUS	BRIEF DESCRIPTION
			public-private partnership to provide investment and financial support for key projects. The two sides agreed to strengthen cooperation through the Asian Infrastructure Investment Bank (AIIB) to play a more important role in improving infrastructure connectivity between Asia and the world.
Memorandum to Strengthen Infrastructure Cooperation	2018	Active	Cooperate in investment, construction and operation of infrastructure related to transportation, including planning, financing, design and consulting, construction, installation and operation of projects.
Joint Action Plan 2019-2023	2018	Active	Promote joint actions for cooperation in trade, agriculture, connectivity, exploitation of unconventional oil and gas, biofuels, infrastructure, electric power, solar and wind, communications, defense, among others.

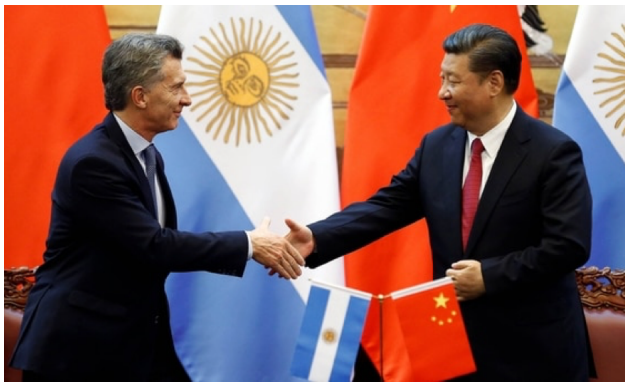
Source: Own elaboration with data from the Digital Library of Treaties, Argentine Chancellery.

project, due to the aforementioned reprisals, was not a possibility. In fact, in the minutes it is explicitly stated that China emphasized the need for the public hearing ordered by the Supreme Court of Justice to be finalized and the resumption of the project approved by the end of May. In addition, China and Argentina signed an Integral Plan for Infrastructure Cooperation (2017-2021), which comprises 16 priority projects, including the construction of the Cauchari Solar Park in the province of Jujuy.

After the confirmation of Mauricio Macri's government to carry out the dams project, bilateral relations improved and China resumed the purchase of soybean oil, signed a livestock agreement authorizing 28 new refrigerators for the purchase of chilled meat (Argentina went on to export 20% of Chinese imports of beef and China in turn purchases 55% of meat exports from Argentina), granted new loans and international support in multilateral credit organizations (including the IMF).

In December 2018, President Xi Jinping visited Argentina again during the G20 meeting in Buenos Aires and was the only president to extend his stay for a state

Image III
Mauricio Macri´s visit to China, 2017



Source: Reuters

visit. Presidents Macri and Xi signed 23 bilateral agreements on energy, mining, agriculture, culture, infrastructure and transport, in addition to the expansion of the SWAP for another US$ 8.7 billion. On the other hand, the agreement for the construction of the fourth nuclear power plant was suspended due to Argentina's economic and financial difficulties (this was the most important project that was being negotiated). The adhesion of Argentina to the Silk Road was not signed as planned either. According to unofficial sources, the reason was the pressure that the United States exerted (and Argentina had to give in due to the important support of the United States against the IMF). However, in the joint statement of the two presidents, Argentina stressed its interest in joining the Silk Road. Currently, Argentina and China have an active exchange in the discussion of financing, prioritization of projects, trade promotion and political coordination through various fora and mechanisms such as the Permanent Binational Commission, the Strategic Dialogue for Cooperation and Economic Coordination; the Mixed Economic and Commercial Commission, and the Interparliamentary Political Dialogue Commission.

Commerce

The commercial exchange increased during the decade of 1980 and 1990, but it was during the presidencies of Néstor Kirchner and Cristina Fernández de Kirchner when China became one of the main commercial partners of Argentina, behind only Brazil in exports and imports. In 2001, China only bought 5% of Argentina's exports, in 2005 it already reached 8%, and by 2010 it surpassed 10% (doubling the percentage in only a decade). Table I summarizes the trade balance between the two countries, which has been deficient for Argentina since 2011.

Argentina has been primarily a supplier of raw materials and natural resources, while China has provided industrial products and technology[9]. In 2016, Argentine exports to China consisted of soybeans (63% of the total), crude oil (8.5%), beef (5.2%), shrimp and prawns (3.6%), tobacco (1.4%), peanut oil (1.2%) and dirty wool sheared without carding (1.1%)[10]. The main problem in this commercial relationship is the concentration of exports to China in very few products (only two or three are the protagonists of this trade relationship) which are raw materials,

9. Bouzas, R. (2009). China y Argentina: relaciones económicas bilaterales e interacciones globales. Autores Varios, China-Latinoamérica: una visión sobre el nuevo papel de China en la región. Instituto de Investigaciones Jurídicas, UNAM, 283-301.
10. Data from the Instituto Nacional de Estadísticas y Censos (INDEC). Available on: https://comex.indec.gov.ar

and to a lesser extent, manufactures based on natural resources. The differences in added value mean that the trade balance is currently deficient for Argentina.

In terms of exports from China to Argentina, these have grown significantly in the last decade, contributing to 20% of total Argentine imports in 2015, and in 2016 to over 18%[11]. Among the most important goods are electronic devices, mechanical devices, chemicals and vehicles. In the field of organic chemicals, Argentina has the highest percentage of total imports from China, which is explained by the growing consumption of agrochemicals in the Argentine agroindustry[12].

Financing

After the narrowing of the bilateral relations between China and Argentina during the Kirchner era, loans from China did not take long to arrive. The main loan granted by China was for the repair of the northern railways (US$ 10 billion), and later for the Belgrano Cargas (US$ 2.99 billion), a railway line of great importance to transport agricultural products to the port. The second highest loan in terms of amount was for the Cóndor Cliff-La Barrancosa hydroelectric dams project in Patagonia, for a total of US$

Table III
Argentine-China trade balance (in millions of US$)

YEAR	EXPORTS	IMPORTS	TRADE BALANCE
2008	9358	5038	4320
2009	4306	3483	819
2010	6802	6116	686
2011	6291	8504	-2213
2012	5864	7011	-1147
2013	6089	8750	-2661
2014	5247	7683	-2436
2015	5716	8813	-3097
2016	5118	7201	-2082
2017	4754	9067	4313

Source: UNTRADE

11. Ibid.
12. "Crecen las importaciones de agroquímicos". Perfil. 2018. Available on: https://fortuna.perfil.com/2018-02-26-194239-crecen-las-importaciones-agroquimicos/ Last Access: 9 March 2019
13. The original cost was US$ 4.714 billions, but after the reduction of the power of the hydroelectric dams in 2017, the cost decreased to US$ 4.316 billions.

4.316 billion[13]. The dams project included 100% financing, while the Belgrano Cargas loan only covered 85% of the cost through a syndicated loan involving the China Development Bank (CDB) and the ICBC. The Belgrano Cargas also included the purchase of new wagons and locomotives from China and the modernization of 1,600 kilometers of railroads between the productive provinces of northern Argentina and the port of Rosario, with the aim of significantly reducing the internal transportation costs of Argentine raw materials destined for exports (including exports to China). In regards to smaller amounts, China granted loans for renewable energies and the development of small or medium-sized enterprises (SMEs) and the export sector. The loans were channeled through the CDB, the China Eximbank and the ICBC.

In 2014, a financial swap of US$ 11 billion was agreed to maintain the stability of the Argentine exchange system. The decline in the price of soy caused a 20% drop in Argentine exports, causing an additional deficit of dollars in the economy (in October 2014, the stock of currencies registered a fall of around US$ 3 billion with respect to the same period of 2013, reaching a floor of US$ 27.5 billion). This agreement also occurred in the midst of the Argentine crisis, with the vulture funds and the declaration of technical default by Argentina. During

Table IV
Chinese loans granted to the Argentine government

YEAR	PROJECT	FINANCIAL INSTITUCION	AMOUNT MM US$
2007	Development of the export sector	CDB	30
2010	Renewal of the 2007 loan	CDB	30
2010	Rail system	CDB and others	10,000
2010	High speed trains	CDB and CITIC	273
2012	Renewable energy projects	CDB	200
2014	Hydroelectric dams in Patagonia	CDB, ICBC, Bank of China	4,316
2014	Railroad Belgrano Cargas	CDB, ICBC	2,100
2014	Financial Swap	---	11,000
2014	Purchase of wagons for railway system	China Eximbank	162
2016	Arauco Wind Park	Bank of China	300
2017	Development of SMEs	CDB	150
2017	San Martín Railway Modernization	China Eximbank	2,400
2017	Cauchari Solar Park	China Eximbank	330
2018	Financial Swap	---	8,700

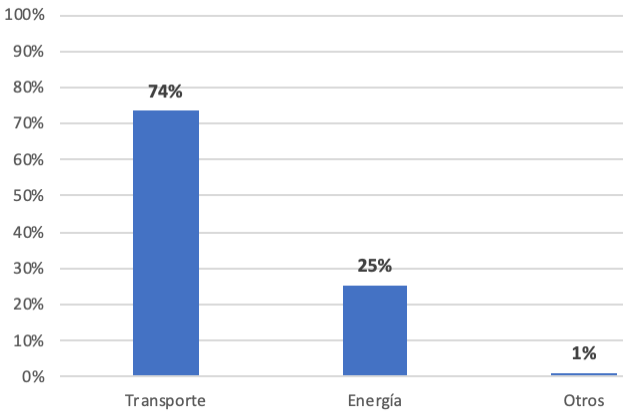
Acronym: CDB (China Development Bank), CITIC (China International Trust Investment Corporation), ICBC (Industrial and Commercial Banck of China).
Source: Own elaboration with data from the Secretary of Energy

2016, there were no new Chinese loans due to the suspension of the dams project in Patagonia. The loans resumed in 2017, when China once again granted a loan of US$ 2,400 million for the modernization of the San Martin railway and US$ 300 million for the construction of the Cauchari solar park.

Table IV shows the loans granted by the traditional multilateral credit institutions of Latin America to Argentina versus those of the Chinese development banks. The investment of the Chinese banks was fluctuating but significantly higher than that of the Inter-American Development Bank (IADB) or the World Bank (WB), which were historically the largest financiers in the country. Unlike the IADB or World Bank investments that cover several sectors (transport, sanitation, education, health, etc.), the bulk of Chinese loans focused on the transport sector, an area that is of great interest to China since it allows to make the commercial exchange with Argentina more efficient, especially with regards to food products of great strategic interest. As shown in Graph 1, transportation obtained 72% of the total borrowed. Investments in the energy sector represented 26%, where the Patagonia hydroelectric plants were the project that received most of the financing. Finally, it is worth noting that the repayment period of these loans is generally long-term, thus compromising the budget and the capacity of future governments to acquire new debts.

Graph I

Chinese loans to Argentina by sector 2007-2018



Source: Own elaboration

Table V

Loans from international financial institutions in Argentina 2010-2017 (in millions of US$)

FINANCIAL INSTITUTION	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL
IADB	1,100	1,251	1,125	1,228	793	765	907	2,164	9,333
World Bank	968.9	4,444.4	0	0	0	2,679	2,000	3,050	13,141
CAF	0	0	0	0	150	70	174	250	644
Chinese banks	1,303	0	200	0	4,762	0	0	2,870	18,135
Total	11,403	1,251	201,125	1,228	947,762	837,679	1,083	258,084	

Source: own elaboration with data of the annual balances of the aforementioned institutions

Chinese Direct Investment

Since 2008, China has positioned itself as one of the main sources of foreign direct investment (FDI) in the world, and as of 2010, this positioning began to have relevance in LAC, when Chinese FDI investment reached US$ 15 billion in the region. In Argentina, Chinese FDI has generally been carried out in two ways. Firstly, representative offices have been opened, with the aim of marketing their products. Secondly, Chinese capital is now associated with one or more shareholders (joint venture) to acquire companies that are already active and operating, which are not part of the business start-up, typical of the joint venture. This is evident in the case of the ICBC which acquired 80% of the shares of Standard Bank Argentina in 2012 for US$ 600 million[14], representing the largest operation of a Chinese bank in Latin America (ICBC today has 103 branches in Argentina, 1,000,000 individual clients and more than 30,000 companies in different sectors)[15]. In addition, at the beginning of 2019 the Bank of China obtained the approval of the Argentine Central Bank to invest US$ 50 million and settle in the country. Unlike ICBC, the Bank of China will not focus on a "retail public ... but will exclusively serve companies [of Chinese origin] to enhance trade between Argentina and China"[16].

Table VI displays the evolution of Chinese FDI in Argentina between 2004 and 2015. This shows a fluctuating behavior, registering its lowest values during 2009 and recovering rapidly in 2010, obtaining a peak in 2012, when FDI reached approximately 743 million dollars. From there, the trend was downward, culminating the period with approximately 208 million dollars in 2015. In LAC, Chinese FDI also fluctuated, with the highest declines in 2008 and in 2012.

It is important to note that joint ventures with Chinese capital are not accounted for in China's IED despite the significant amount of investments. In 2009, for example, the

Table VI

Chinese direct investment in Argentina and Latin America and the Caribbean (in millions of US$)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Argentina	1	0	6	136	108	-22	27	185	743	221	270	208
LAC	1,763	6,466	8,468	4,902	3,677	7,327	10,538	11,935	6,169	14,358	10,540	12,610

Source: Ministry of Commerce, National Bureau of Statistics and National Administration of Foreign Currency of the People's Republic of China, Statistical Bulletin of FDI of China, China Statistics Press, Beijing, 2016.

14. "ICBC buys 80% of Standard Bank Argentina". China Daily. 2011. Available on: http://www.chinadaily.com.cn/business/2011-08/05/content_13061176.htm Last Access: 9 March 2019
15. "El ICBC revela claves del desembarco en Argentina y su plan para seducir con descuentos a la clase media". iProfesional. Available on: https://www.iprofesional.com/notas/158725-El-ICBC-revela-claves-del-desembarco-en-Argentina-y-su-plan-para-seducir-con-descuentos-a-la-clase-media Last Access: 9 March 2019
16. "Bank of China llega a la Argentina: invertirá u$s50 M y se enfocará en grandes clientes". iProfesional. March 2019. Available on: www.iprofesional.com/finanzas/287620-ahorrista-acciones-banco-Bank-of-China-llega-al-pais-con-inversion-de-USD-50-millones Last Access: 9 March 2019

China National Petroleum Corporation (CNOOC) acquired 50% of the shares of the oil company Bridas for US$ 3.1 billion, which operates jointly with British Petroleum and, in 2011, China Petrochemical Corp (Sinopec Group) acquired 100% of the subsidiary of Occidental Petroleum Corp (OXY), called Occidental Argentina Exploration and Production, Inc. for US$ 2.45 billion, but these investments are registered in the balance of payments as coming from some offshore financial centers or offshore financial center, and therefore are not considered Chinese FDI. Another peculiar characteristic is that firms with Chinese capital tend to offer significantly better terms than competitors in tenders, to the point of becoming economically irrational in some cases. The robust financial capacity of these companies, together with the support of the Chinese government, allows companies to operate with lower margins or even negative returns. This extra price paid by companies is correlated with the competition that exists between Chinese companies to obtain projects, rather than a central policy planned by the government. In fact, the Chinese government is currently seeking to create consortia of companies to mitigate competition.

CHINA'S PARTICIPATION IN ARGENTINA'S ENERGY MATRIX

The electricity sector in Argentina is the third largest energy market in Latin America after Brazil and Mexico. In 2016, 62.65% of electricity came from conventional fossil-fuel sources, 32.23% from hydroelectric sources, 5.3% from nuclear energy and 2.11% from renewable sources (see Table VII).

Demand for electricity grew steadily between 1991 and 2015, with a fall during the 2001-2002 crisis but followed by a rapid recovery (6-8% annual increase) due to the economic recovery. Residential consumption accounts for 29% of the total, and industrial and commercial consumption accounts for 43% and 26%, respectively[17].

The decision of the Kirchners to freeze public service tariffs at prices well below cost caused energy companies (private and state-owned) to reach the brink of bankruptcy. Edenor, Edesur and Edelap (the three largest electricity companies) accumulated losses in the order of AR$ 2 billion (equivalent to US$ 350 million) in 2012[18]. The lack of investment in the energy sector caused Argentina to go from being an energy exporter to become an importer. In 2011, after more than 20 years of surplus and achieving record exports, the country lost self-sufficiency in gas and oil

17. National Institute of Statistics and Census. Visit: www.indec.gob.ar
18. ¿Por qué se gastan millones en importar energía y la Argentina está sin luz?". iProfesional. 20 December 2013. Available on: http://www.iprofesional.com/notas/176789-combustibles-importaciones-deficit-energia-Pregunta-incomoda-por-que-se-gastan-millones-en-importar-energia-y-la-Argentina-esta-sin-luz Last Access: 9 March 2019

products and has now returned to depend on imports. In 2017, the purchase of natural gas represented 70% of the energy imports, followed by diesel (32%), petroleum (18%), fuel oil (14%), and electric power (4%)[19].

At the beginning of the government of President Mauricio Macri an energy emergency was declared and the development of renewable sources was established as a state priority. In 2016, Macri launched a renewable energy auction program[20] called RENOVAR, from which two tenders were held, auctioning 59 projects with 2.4 GW in capacity valued at US$ 4 billion[21]. The program triggered great interest in the private sector, including Chinese investors, who presented proposals to develop solar and wind energy projects[22]. In March 2019, with the incorporation of solar projects in the province of San Luis, there would be 30 solar projects that are already operating commercially in Argentina with a total installed capacity of 795 MW, an investment of US$ 1,220 million.

Table VII
Electricity generation mix in Argentina (2016)

SOURCE		POWER (MW)		%	
Fossil	Combined cycle	9,227	20,764	27.84%	62.65%
	Gas turbine	5,251		15.84%	
	Steam turbine	4,451		13.43%	
	Diesel engine	1,834		5.53%	
Hydro		10,682		32.23%	
Nuclear		1,755		5.3%	
Renewable	Solar	8	700	0.02%	2.11%
	Wind	187		0.56%	
	Hydro < 50MW	488		1.47%	
	Biogas	17		0.05%	
Total		**33,141 MW**		**100%**	

Source: Secretariat of Energy of Argentina

19. Balance Energético Nacional de la República Argentina, 2017. Available on: https://www.argentina.gob.ar/energia/hidrocarburos/balances-energeticos-0 Last Access: 9 March 2019
20. Renewable energy includes solar, wind, biomass, geothermal and hydropower less than 50MW.
21. Upon winning the tender, a project signs a PPA contract in dollars (Power Purchase Agreement) with the Electricity Wholesale Market Management Company (CAMMESA) for the sale of electricity generated through renewable sources.
22. Ibid.

China's interest in Argentina's energy sector is not new. This interest has traditionally been focused on the fossil fuels sector, but since 2016 it has been incorporating hydro, solar and wind energy projects. A 2013 report from the Argentine Council of International Relations (CARI, for its Spanish acronym)[23] indicates that China sees Argentina as a strategic partner in both the food and energy sectors. Although soybeans are still China's main interest in Argentina, China has also played an important role in the Argentine energy sector over the last few years, when CNOOC became the second largest oil company in Argentina, only after the state-owned company YPF. In March 2010, CNOOC bought 50% of the Argentine oil company Bridas, and in November of that year, Bridas, which already had a Chinese majority, acquired 60% of Pan American Energy (PAE), and in turn, PAE acquired all the assets of Esso Argentina in February 2011. In addition, in 2011 Sinopec Group purchased the entire Occidental Argentina Exploration and Production, and in January 2013, CNOOC partnered with state-run YPF for the exploitation of oil in the giant Vaca Muerta unconventional oil and gas reserve.

Table VIII

Chinese loans and investments in the Argentine energy sector (in millions of US$)

	PROJECT	COMPANY	INVESTMENT
2015	Cóndor Cliff-La Barrancosa Dams (1350 MW)	Gezhouba Group Company Ltda.	4,316
2016	Cauchari Solar Park (300 MW)	Shanghai Electric / Powerchina Ltda	300
2016	Arauco Wind Farm (150MW)	PowerChina Ltda.	300
2016	Loma Blanca I, II y III (200MW)	PowerChina Ltda.	510
2017	Los Meandros (75MW)	Envision Energy SA y Sowitec	150
2017	Vientos del Secano (50MW)	Envision Energy S.A.	NA
2017	García del Río (10MW)	Envision Energy S.A.	NA
2017	Cerro Alto (50MW)	Envision Energy SA	57
2017	El Angelito (200 MW)	Sinowind	435
2017	Cafayate Solar Park (97.6MW)	Canadian Solar – PowerChina Ltda.	150
2017	Miramar Wind Farm (96MW)	Goldwin – PowerChina Ltda.	75

Fuente: Own elaboration with data from the National Secretary of Energy[24]

23. "Las crecientes relaciones entre China y América Latina: análisis de sus múltiples dimensiones". Centro Argentino para las Relaciones Internacionales (CARI). 2013.

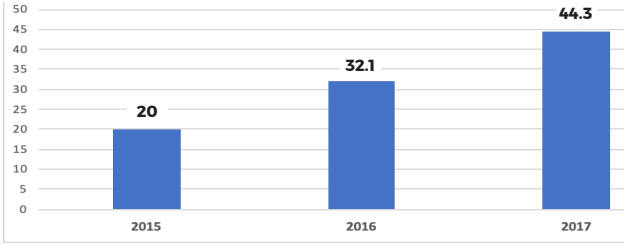
24. "Dos firmas chinas activan sus proyectos de energías renovables". Econojournal. January 2018. Available on: https://econojournal.com.ar/2018/01/dos-firmas-chinas-activan-sus-proyectos-de-energias-renovables/ Last Access: 9 March 2019

As we can see from Table VIII, China's investments in the energy sector is diversifying. Before 2015, China's participation was limited to the oil and hydroelectric sector, and only in the two following years, China focuses on medium and small-scale renewable energy projects. In fact, the Argentine branch of Powerchina Ltd. alone participates in 5 wind farms with 355 MW total and 4 solar parks totaling 412.6 MW, with a total investment of one billion dollars in this country[25]. Currently, according to several sources, China has become the world's largest supplier of materials to the renewable energy industry (although many of these sources mistakenly count large dams as renewable energy) and intends to expand its industry to new markets, including the Argentinian. A report published by the Institute of Energy Economics and Financial Analysis (IEEFA)[26] indicates that from 2003 to 2017, of the total amount invested by Chinese state companies in energy overseas, 48% went to the hydroelectric sector; 17% to coal; 11% to nuclear plants; 10% wind energy; 9% gas; 4% transmission networks, and less than 1% to solar energy[27]. In 2018, according to the Global Development Center of Boston University, China lent US$ 8.82 billion for the development of global energy projects, of which more than half went to projects in Africa and only 7% in ALC[28]. Of the total Chinese loans of 2018, 18% went to the exploration, extraction and optimization of natural liquefied gas; in terms of energy generation, 42% went to fossil-fuel projects, 12% natural liquefied gas, and 20% hydro; and 8% for transmission and distribution of energy[29]. There was no approved credit for the development of solar or wind energy, even though it is estimated that Chinese solar panel manufacturers have a cost saving advantage of 20% over their US peers, mainly due to scale economies and to the development of a more efficient supply chain[30].

However, given China's strength in terms of technology, installed capacity and financing availability, China still has the opportunity to become a global leader in wind and solar power. The transition to a low carbon economy would not only have positive effects on China's green industry, but would

Graph II

Chinese foreign investments in renewable energy (in billions of US$)



Source: World Economic Forum

25. Information on www.powerchina.com.ar
26. "China Is Investing Heavily in European Wind". IEEFA. August 2018. Available on: http://ieefa.org/wp-content/uploads/2018/08/China_Research_Brief_August-2018.pdf Last Access: 9 March 2019
27. "China, el gran vencedor de la retirada de EE.UU. del Acuerdo de París". CNN. 2017. Available on: https://cnnespanol.cnn.com/2017/06/02/china-el-gran-vencedor-de-la-retirada-de-ee-uu-del-acuerdo-de-paris/ Last Access: 9 March 2019
28. Xinyue Ma, Kevin P. Gallagher, Xintong Bu "Global Risks and Investment Uncertainty: Chinese Global Energy Finance in 2018". Global Development Policy Center. February 2019. Available on: http://www.bu.edu/gdp/files/2019/03/2019-CGEF-Database-Policy-Brief-1-1.pdf
29. Ibid
30. Ibid

also have an impact on the distribution of global economic power by benefiting oil-importing countries such as China[31] and punishing those who depend on the fossil industry, as carbon investments could become stranded.

CAUCHARI SOLAR PARK

The Cauchari Solar Park was the result of the first round tender of RENOVAR carried out in 2016.The plant is located in the zone that receives the most annual solar energy of Argentina (and one of the most in the world) in the town of Cauchari, in the Province of Jujuy (in northwestern Argentina that borders Chile to the west and Bolivia to the north, see map)[32]. The solar park is formed of Cauchari I, Cauchari II and Cauchari III: between the three plants a power capacity of 300 MW is expected. The electricity generated will be connected to the National Interconnected System (SIN) through the Altiplano Transformation Station, which has a capacity to supply around 300,000 households. The plant will have 1.2 million solar panels spread over 800 hectares, more than 4,000 meters above sea level. Each solar plant consists of 42 subsets called solar fields, which have a power capacity of 2,500 KW each. Each solar field is composed of a transformation center, two inverters of 1,250 KW fed by 430 chains of 22 solar panels of 265 W, with an installed power of 100 MW[33].

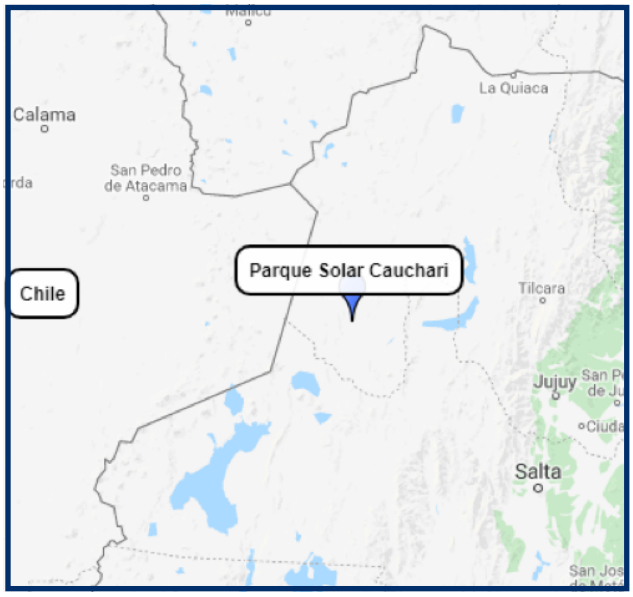
The construction of the plant is in charge of the company Shanghai Electric Power Construction (a jointly owned company where 63% is state-owned[34]) and a subsidiary of Power Construction Corporation of China (Powerchina). Powerchina is a state-owned company created in 2011 by the union of 14 provincial, municipal and regional electric power and design, engineering and equipment manufacturing companies. Powerchina ranked 190th among the Fortune Global 500 in 2016 and is the world's leading dam construction company[35]. Continuing the policy of Going Out, Shanghai Electric is trying to develop internationally. Thus, in 2018, the company signed an agreement with the National Energy Agency of Brazil to build 17 lines and 8 sub-stations in the Porto Alegre region (capital of the state of Rio Grande do Sul) for US$ 1.01 billion[36]. The Chinese company Talesun is the provider of solar panels for Cauchari and is internationally recognized for its work in the field of photovoltaic energy[37].

The contractor of the project is the state-

31. Mercure, J. F., Pollitt, H., Viñuales, J. E., Edwards, N. R., Holden, P. B., Chewpreecha, U., ... & Knobloch, F. (2018). Macroeconomic impact of stranded fossil fuel assets. Nature Climate Change, 8(7), 588.
32. Cauchari is also part of the well-known "lithium triangle", the area with more resources of this mineral in the world.
33. "Los detalles sobre el Parque solar Cauchari". Energía Estratégica. 2018. Available on: http://www.energiaestrategica.com/costos-plazos-financiamiento-del-parque-solar-cauchari-se-aplicara-take-or-pay/ Last Access: 9 March 2019
34. "China SOE's restructuring leaves state ownership intact". Finantial Times. 2018. Available on: https://www.ft.com/content/902826f4-c878-11e4-8617-00144feab7de Last Access: 9 March 2019
35. Information available on: http://fortune.com/global500/powerchina/
36. "Brazil approves transfer of power project to Shanghai Electric". Reuters. 24 October 2017. Available on: https://www.reuters.com/article/brazil-power-shanghaielectric-idAFE6N1LE016 Last Access: 9 March 2019
37. More information on www.talesunenergy.com

own company Jujuy Energía y Minería Sociedad del Estado (JEMSE), created in 2011 through Law 5,675 and decree 7,626. JEMSE works as a private company that aims to develop the mining, hydrocarbon and energy sector of Jujuy. One of the most controversial agreements signed by JEMSE was the authorization to the Chinese company JHP International Petroleum Engineering Ltd. to explore the Caimancito oil field until the year 2037. The controversy comes especially since this deposit is located in the Calilegua National Park, whose exploitation would violate the National Parks Law (22,351), the Native Forests Law (26,331) and the Hydrocarbons Law (17,319).

Map I
Location of the Cauchari Solar Park



Source: Google Maps

The total cost of the project is US$ 390 million, to which sum should be added US$ 60 million for operating expenses and civil works and US$ 92 million for taxes on income from construction materials, which will be reimbursed by the Tax Collection Agency to the province of Jujuy[38]. To connect the electricity generated in Cauchari to the National Interconnected Electric Power System, the Ministry of Energy is building and financing the Transformation Station of the Altiplano, whose budget is around US$ 50 million, bringing the total cost to US$ 500 million[39].

The contract with the Chinese company included the design, construction and operation of the plant. For the agreed price Shanghai Electric Power Construction must deliver to the province of Jujuy the Solar Park Cauchari in operational condition. The contract establishes the performance requirement of the Solar Park with a performance ratio (performance ratio or PR) of 86.7%. The performance ratio is the index that calculates what Cauchari produces compared to what it should produce under ideal conditions. Failure to obtain this performance would apply penalties to the construction company[40].

The financing of the project was structured as follows: 85% corresponds to a sovereign debt credit granted by China Eximbank and 15% to the green bond issued by the province of Jujuy in the international market,

38. "Nuevo contrato: el Gobierno negoció postergar inicio de obra del mega parque solar de Jujuy". Energía Estratégica. Marzo de 2018. Disponible en: http://www.energiaestrategica.com/nuevo-contrato-gobierno-negocio-postergar-inicio-obra-del-mega-parque-solar-jujuy/ Last Access: 9 March 2019
39. "Avanza en Jujuy la construcción del mayor parque solar de Argentina". Econoticias. January 2018. Available on: www.ecoticias.com/eco-america/179745/Avanza-en-Jujuy-la-construccion-del-mayor-parque-solar-de-Argentina Last Access: 9 March 2019
40. Interview to Guillermo Hoerth, Op. Cit.

being also the first green bond of Argentina. The China Eximbank loan of US$ 331.5 million was agreed in May 2017 during the meetings between Presidents Macri and Xi in Beijing. This loan has an interest rate of 3% plus 0.75% of the Management Fee, and 0.75% of the Commitment Fee. The loan repayment period is 180 months (15 years), and the grace period is 60 months (5 years), with a repayment period of 120 months. On the other hand, the green bond[41] issued by the province of Jujuy was offered on the New York Stock Exchange and attracted the interest of European, Asian, Latin American and United States investors. The bond rate was 8.625% per year with a maturity of 5 years and semi-annual payments[42].

Image IV
Location of the Cauchari Solar Park

Source: Reuters

Benefits and Challenges of the Project

Cauchari presents unbeatable conditions for the deployment of a photovoltaic solar park due to the low temperatures that allow the solar panels to cool more easily while the scant vegetation and scarce amount of rains contribute to the ventilation of the equipment[43]. In addition, the flat surface of the area means that the costs of construction works are reduced. Regarding the logistics, the project benefits from being located close to national and international transport routes -which facilitates the construction and operation of the plant- and the existence of an electric line that passes through the area and that will be used for the export of the electricity produced in the solar park[44].

According to official sources, the plant will sell electricity to the Electricity Wholesale Market Administrator (CAMMESA) at a price of US$ 60 per MWh under a 20-year Power Purchase Agreement (PPA)[45]. The energy produced by Cauchari will be able to supply 300,000 households (the provincial government estimates that 1,200,000 people will benefit), which will result in the reduction of carbon dioxide emissions by replacing electricity produced by fossil fuels[46]. If the solar conditions were optimal, the gross billing of Cauchari would reach US$

41. A green bond is a bonus issued specifically for climate and environmental projects. These bonds are usually linked to assets and backed by the issuer. Green bonds generally offer tax incentives such as exemption from taxes and tax credits, making them a more attractive investment compared to a comparable taxable bonus. To qualify as a green bond, the project must be verified by a third party, for example, the Climate Bond Standard Board, which certifies that the bond funds projects that include benefits for the environment.
42. "Bono para el Desarrollo de Cauchari". Government of Province of Jujuy. Available on: http://prensa.jujuy.gob.ar/tag/bono-verde/
43. See solar radiation map of the Province of Jujuy. Report made by INENCO - CONICET. Available on: http://inenco.unsa.edu.ar/primer-mapa-de-radiacion-solar-para-jujuy
44. "Así será la megaplanta solar de Jujuy, que costará US$ 390 millones y será la más grande de América latina". La Nación. October 2017. Available on: https://www.lanacion.com.ar/2069865-planta-solar-cauchari-asi-sera-megaplanta-solar-de-jujuy-que-costara-us-390-millones-y-sera-la-mas-grande-de-america-latina Last Access: 9 March 2019
45. Information available on: http://portalweb.cammesa.com/Pages/RenovarInt.aspx Last Access: 9 March 2019
46. Interview to Guillermo Hoerth, CEO Cauchari Solar. Conducted on 28 September 2018

65.7 million per year, which once subtracted the costs of operation, maintenance, taxes, the Chinese corporate participation of 20%, the contribution to indigenous communities of 2% and the amortization of the credits, should leave the Jujuy government with a net billing of US$ 25 million per year for the sale of electricity[47]. These expected results have encouraged the authorities of Jujuy to start the construction of another 500 MW solar park[48].

The Cauchari project is located on 13,500 hectares of indigenous lands, whose communities have legal status and title to the land. However, through Provincial Law N ° 5915 approved in 2016, the government authorized the usufruct of these lands for the development of renewable energies, as long as the communities give their consent and participate in the profits[49]. The Jujuy government made two agreements with the communities. In the first place, it was agreed that the communities will

Table IX
Cauchari Solar Park

PROJECT DETAILS			
Location		Cauchari, Jujuy, Argentina	
Current state		Under construction	
Start date of work		2017	
Energy source		Solar PV	
Power		300 MW	
Average electricity generated		230,000 MWh per annum	
CONSTRUCTION CONTRACT			
Bidding	1st round RENOVAR		
Parties	Project owner	Jujuy Energía y Minería Sociedad del Estado (JEMSE)	
	Contractor	Shanghai Electric (Powerchina Ltd)	
Total investment	US$ 440 millions		
FINANCING			
Financing	China Eximbank		US$ 331.5 millions
	Green bond emitted by the Jujuy Province		US$ 210 millions

Source: National Secretary of Energy

47. "Jujuy ganará 25 millones de dólares por año con Cauchari". Cronista. 2018. Available on: https://www.cronista.com/economiapolitica/Energias-renovables-Jujuy-ganara-us-25-millones-por-ano-con-Cauchari-20181007-0010.html Last Access: 9 March 2019
48. Ibid.
49. See Provincial Law N° 5915. Available on: http://www.legislaturajujuy.gov.ar/img/sesiones/ftp/s_2634/Ley_5915_33-PE-16.pdf

receive 2% of the profits that Cauchari will generate, a figure that could reach to US$ 1 million per year; and second, the inhabitants of the communities will receive training to work in the construction and operation of the plant[50].

The professional training of the local inhabitants began in 2017, and was carried out at the National Defense University. According to the CEO of Cauchari Solar, Guillermo Hoerth, 600 residents of 109 communities from the Puna were already trained in electricity, construction and assembly of metal structure and welding, and indicated that jobs will be offered in relation to the needs of the project[51]. During the construction phase, there were some conflicts with the workers due to hiring conditions and precarious work facilities (for example, there were no toilets)[52]. The government of Jujuy has designed a program to sustain the work when the construction phase ends (at this stage, 900 direct and 1000 indirect jobs will be generated)[53]. Such a program will focus on the tourism sector (in hopes that it will turn the plant into a tourist attraction); catering services for the camp (estimating that 40 people will work here); transfer services to the Solar Park; and security services. On the other hand, for the construction of Cuachari, 20 people from China arrived, including engineers, translators, office workers and cooks[54].

According to the Secretary of Indigenous Affairs of the Province of Jujuy, Natalia Sarapura, the Solar Park is generating work in a community that was shrinking every day due to migration to other cities for work. In her words: "From the exodus we are returning to our community. There are many men and women who were working in other places, harvesting olives or apples, or working as builders in other provinces that are returning to our territory. For the members of the indigenous communities, this means a lot. The land is the home of their grandparents, the place of their family and the means of encountering oneself"[55]. Still more, some think that the Solar Park gives utility to lands without other alternatives of use, since the arid and extreme topography of the Puna limits the economic activities that can be developed[56]. In addition, according to Sarapura, the dialogue with the communities began since the first day that the current government assumed power in 2015, noting that there is "a very close and fluid relationship with communities where they try to meet all demands"[57]. Sarapura remarked that this is an unprecedented

50. To this objetive, seven cooperatives were formed: Cooperativa de Trabajo Los de Sey Ltda, which provides mechanical and mobile assistance services, Cooperativa de Trabajo Cauchari Ltda, which is dedicated to property surveillance services, the Cooperativa de Trabajo Servicios de Salud Susques Ltda that attends medical emergency services; Cooperativa de Trabajo San José Ltda with transport services of personnel, the Cooperativa de Trabajo Puesto Sey Ltda in charge of personal transport and car rental, the Cooperativa de Trabajo de Catering y Hospedaje El Tuzgle Ltda that provides catering and lodging services, and Cooperativa de Catua dedicated to waste collection and transport of personnel.
51. Interview to Guillermo Hoerth, Op. Cit.
52. "Conflicto laboral en la planta solar". Jujuy al Momento. 2018. Available on: http://www.jujuyalmomento.com/post/95231/conflicto-laboral-en-la-planta-solar.html Last Access: 9 March 2019
53. Ibid.
54. Interview to Guillermo Giralt, Technical Director of Cauchari Solar. Conducted on 6 October 2018
55. "Parque Solar Cauchari, la plata fotovoltaica más importante del país". Diario Inédito. 2017. Available on: http://diarioinedito.com/contenidos/27101-parque-cauchari-solar-la-planta-fotovoltaica-mas-importante-del-pais Last Access: 9 March 2019
56. Interview to René Calpachay, indigenous community representative. Conducted on March 2019.
57. Interview to Natalia Sarapura, Secretary of Indigenous Peoples of the Province of Jujuy. Conducted on 14 September 2018
58. Ibid.

project in the country, where for the first-time profits are shared with the community and there is creation of quality jobs[58]. The same position was shared by René Calpanchay, delegate of the Atacama People (one of the affected communities), who affirms that the consultation was carried out according to the legislation, and that the community gave its consent to carry out the project on their land, not only for the positive impacts on the environment, but also because it generates work and development in the community[59]. Moreover, Calpanchay maintains that the communities of Jujuy have participated in several projects in the past that have not given them any benefit or had negative consequences for the environment. But Cauchari offers a triple positive impact solution: "Many communities in Jujuy are already asking for more solar projects like Cauchari, even smaller, that can be mounted more easily and generate work and resources for the people"[60].

Image V
Location of the Cauchari Solar Park

Source: Reuters

Two problems arose in the Cauchari Solar Park project related to the lack of environmental information and the shortcomings in the consultation processes. These events were documented by the Environment and Natural Resources Foundation (FARN, for its Spanish acronym) in May 2018 in a request for information addressed to the Secretariat of Indigenous Peoples[61]. In such request, FARN exhibits several Argentine and international laws that would have been violated when the Environmental Impact Study (EIA) of the project was not published in a complete and timely manner, and highlights the lack of information on the implementation of the right to free consent, informed and prior, among other things, because without the communities having access to the EIA, the requirement of "informed consent" could not have been fully met. Furthermore, FARN also noted that the minutes of meetings held with some communities have later dates (February and August 2017) than the declaration of environmental feasibility of the project, which was carried out in 2016. Unfortunately, the Secretariat of Indigenous Peoples did not respond to FARN's request for information. In the same vein, there is concern (according to a public draft version of the loan agreement with China Eximbank) that JEMSE had already signed the Engineering, Acquisitions and

59. Interview to René Calpanchay, Op. Cit.
60. Ibid.
61. Information requested by Fundación Ambiente y Recursos Naturales on May 2018. Available on: https://farn.org.ar/wp-content/uploads/2018/05/secretaria-de-pueblos-Indigenas-JUJUY.pdf
62. Preferential Buyer Credit Loan Agreement on Jujuy Photovoltaic Power Plant Project. Available on: http://servicios.infoleg.gob.ar/infolegInternet/anexos/285000-289999/287144/dec922-1.pdf Last Access: 9 March 2019

Construction contract for Cauchari I, II and III in August 2016, and an addendum that would be called the "commercial contract" in February 2017[62].

The EIA was carried out by the company W & E SRL and reveals that the environmental impacts of Cauchari are mainly concentrated in two points. First, there are potential problems that include fuel loss, sewage, and contamination related to the construction process. The second point of concern is the waste generated by the packaging of the thousands of solar panels that are imported from China, against which, according to the CEO of Cauchari, different ways of approaching the problem are being studied. One of the possible solutions comes from a joint project with the Ministry of Education of Jujuy where materials including wood and packaging plastic would be recycled by rural schools[63].

According to Guillermo Giralt Technical Director of Cauchari Solar, due to the scarce vegetation and fauna of the area there will be no serious impacts to the ecosystem[64]. Giralt states that "the fauna of the place is made up of rodents of the Chinchillidae family, which could be impacted by the noise of the construction, but then return to normal when the plant is in operation. As for the flora, it would be affected in the construction phase for the preparation of the land to install the panels, however, it would also recover quickly once construction is complete. At the same time, ditches of one and a half meters were made to channel the water from the rainfall, without major impacts on the ecosystem"[65]. In relation to the lifespan of the photovoltaic solar panels, the main component of the plant, Giralt said that these do not contain toxic elements but it is still too early to analyze what will be done with them in the future (for now the viability of the panels is 20-25 years) because, given rapid technological advances, it is possible that their viability can be extended, or that new ways to recycle them can be found. During the process of socialization of the EIA, according to Giralt, only one complaint was registered for possible effects on the birds of the place, but it obtained little repercussion for lack of foundations and evidence[66].

Based on the information obtained, the risks of the project are relatively low since the construction and its operation is comparatively simpler than other renewable energy projects. However, there are challenges that should not be underestimated, such as: (i) possible delays (which are already occurring) in the construction of the Altiplano Station that will allow to distribute the electricity generated by Cauchari[67]; (ii) there are very few solar plants in the world with an initial power of 200-300 MW and none in LAC; consequently, there are few specialized supplier companies and lack of trained local personnel. In this sense, the CEO of Cauchari pointed out that: "although

63. Interview to Guillermo Hoerth, Op. Cit.
64. Interview to Guillermo Giralt, Op. Cit.
65. Ibid.
66. Interview to Guillermo Hoerth, Op. Cit
67. "La planta solar funcionará recién en 2019". Jujuy al Momento. 2018. Available on: http://www.jujuyalmomento.com/post/81447/la-planta-solar-funcionara-recien-en-2019.html Last access: 9 March 2019.
68. Interview to Guillermo Hoerth, Op. Cit.

the installation technique is simple, one must be careful in the details to obtain the desired production yields"[68]; (iii) the transport logistics of the solar panels is a critical challenge of the project. Most of the materials coming from China will enter through the Paso de Jama (4,200 meters above sea level) from the port of Atacama. The transfer of materials will require approximately 3,000 containers, which generates new environmental and safety problems; and (iv) the risk that the expected electricity will not be obtained due to problems with the availability of solar resources or operational problems with personnel working at 4,000 meters above sea level (this may cause health problems and/or decrease the performance of the staff) [69].

CONCLUSIONS AND RECOMMENDATIONS

China became a central partner for Argentina during the presidency of Cristina Kirchner with the establishment of the Integral Strategic Partnership that laid the foundations for long-term cooperation. Although the bilateral relationship suffered a political impasse when the government of President Mauricio Macri tried to revise the cooperation policy, especially in reference to the bilateral agreements signed around the Cóndor Cliff-La Barrancosa hydroelectric dams and the Neuquén nuclear power plant, it was reactivated quickly, even reaching "new heights" with the signing of 40 bilateral agreements. In summary, the commitments already assumed and the dependencies established, added to the fact that Argentina needs to keep the Chinese market open to its products (mainly soybeans), and to Chinese investment, are sufficient reasons to think that the relations between both countries will continue to strengthen in the next decade, no matter which party occupies the presidential chair in Argentina.

An important lesson from the Cauchari Solar Park project is that the capacity of a national government to produce public policies and alternative energy projects cannot be ignored by China. On the contrary, it can be aligned with the Chinese interests. Chinese financing in wind and solar energy represents the best opportunity to achieve a "win-win" relationship between China and Argentina. In addition, this project also stands out for presenting some principles and practices that differ positively from what has been observed in other Chinese projects in the country, especially in relation to the openness shown by Chinese companies in being part of multi-actor spaces, their willingness to accept interviews and discuss some potential benefits for the communities.

The challenge now is how to replicate and raise the scale of wind and solar energy projects in bilateral cooperation; and at the same time, ensure that Chinese financing moves away from fossil energy projects, large dams and other projects that impede Argentina's transition to a low-carbon economy. To advance these objectives,

69. Ibid.

IISCAL proposes the following:

At the policy level

- Form a multi-stakeholder bilateral mechanism with the task of producing a Joint Action Plan to support Argentina's transition towards a diversified and sustainable energy matrix. Some tasks for this mechanism should include, but not be limited to: (i) the establishment of ambitious targets to reduce Chinese financing to the oil, gas and large dams sector, and compensate with economic incentives the development of solar and wind energy, energy efficiency, smart cities and improvements in the transportation system; and (ii) the implementation of due diligence mechanisms and environmental and economic audits of large current energy projects, as in the case of the Condor Cliff-La Barrancosa dams in order to prevent and mitigate impacts, and if necessary, based on the results of the audits, re-consider the viability of the projects.

At project level

- Each project should have an open database that allows the public to have complete and up-to-date information on environmental and social impact studies, environmental monitoring reports, company policies, project costs and financing, and complementary works, key personnel of the project, lists of suppliers, community programs, labor aspects, etc.

- In relation to Environmental Impact Assessments, these must be published in a complete and timely manner, regardless of their extension or technical complexity, and must be a mandatory and prior condition for any consultation with local communities.

- In relation to the right to free, informed and prior consent, the promoters of the project should publicly commit themselves not to advance with projects that have not obtained such consent.

- The environmental and social guidelines issued by various instances of the Chinese government, such as the Green Credit Directive, the Guidelines for the Environmental and Social Impact Assessment of China Eximbank; the Guide for the Social Responsibility of Chinese International Contractors, and the Guide for the Protection of the Environment in Foreign Investments and Cooperation, must be taken into consideration with all the relevant stakeholders and must be included in the loan contracts, as appropriate, in order to ensure their implementation.