THE SHELL CASE

HEADING SOUTH

THE DASH FOR UNCONVENTIONAL FOSSIL FUELS IN ARGENTINA

SUMMARY / MAY 2014

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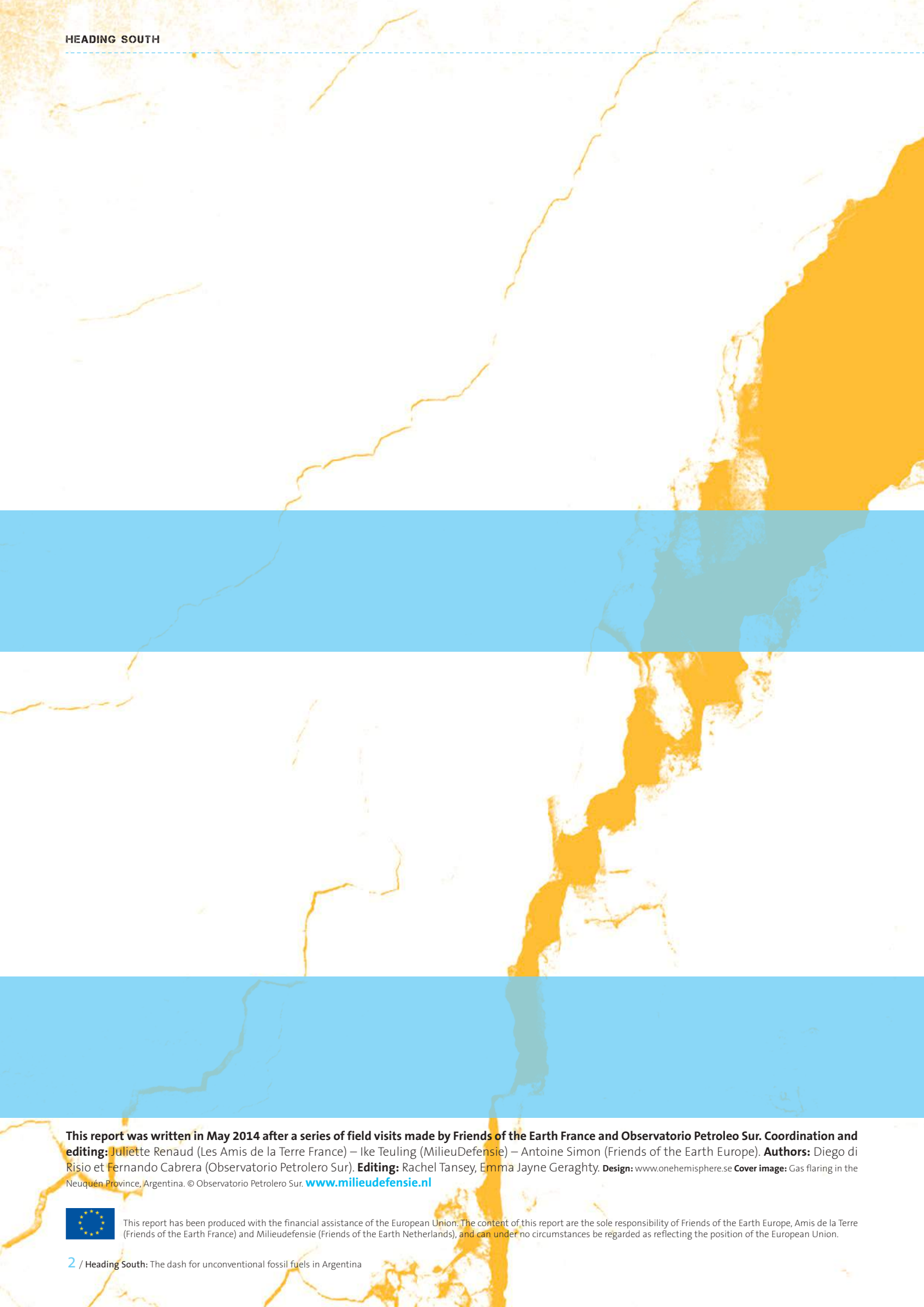

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INTRODUCTION

The growth of unconventional fossil fuels (UFF)[1] has led to unprecedented changes in the geopolitics of the global oil and gas sector. Following the North American experience of the last decade, many countries have taken steps towards the exploitation of these potentially important resources, at a time when conventional oil and gas resources are being rapidly depleted. The impact of unconventional fossil fuels in Argentina is particularly important because, according to the United States Energy Information Agency (EIA), Argentina is a global power in shale resources: second in gas and fourth in oil reserves of the unconventional variety. Argentina's Vaca Muerta formation is considered by the EIA as the best potential shale basin outside North America.

As a result, Argentina has seen a significant increase in interest from the major multinational players in the sector, who have placed a particular focus on northern Patagonia. Chevron, Total, Shell, ExxonMobil, Wintershall, Petrobras and others, have already advanced various projects, and announcements of new projects are made almost daily. Many actors have been pressing for changes in the legal framework regarding UFF development, ostensibly in order to accommodate the impact on the general welfare of the population of rising energy prices and a shift towards energy exports.

The growing imports of fuel into Argentina, due to the decline of domestic conventional fossil fuels production, led to the partial re-nationalization of Yacimientos Petrolíferos Fiscales (YPF), Argentina's largest oil company. State intervention has however, somewhat counter-productively,opened the door to UFF, perpetuating an energy mix based almost entirely on fossil fuels, with significant technological and financial input from transnationals.

This was made possible by legal gaps and a lack of state regulatory capacity against the introduction of a mass scale technology known as high-volume hydraulic fracturing (also known as 'fracking'), providing more lucrative opportunities to companies such as Chevron, Total and Shell. The development of UFF is also linked to legal reforms that have restricted public consultation and popular participation, and has been accompanied by violations of environmental and indigenous communities' collective rights, including the introduction of UFF developments in protected areas. This has resulted in both direct and indirect violence, as well as suppressing the self-determination of the population and the genuine search for alternative and clean energy sources.

Faced with this picture, a large number of organizations have started to resist UFF development. Citizens' demands have focused on the environmental risks, the insignificant local benefits of the income obtained, the lack of participation and consultation, and the loss of sovereignty. Opposition has grown nationally, and today more than 30 municipalities have declared themselves 'fracking-free zones'.

Open tailing pond inside a Mapuche territory in Neuquén.
© Observatorio Petrolero Sur

1 'Unconventional fossil fuels' is a term used to define a number of extreme energies (shale oil and gas, tight gas, coal bed methane, tar sands). While Argentina has potential resources of tight gas and coal bed methane, the report will primarily focus on the shale gas and oil sources of energies as they have the greatest potential and as they systematically require the use of hydraulic fracturing.

2 http://www.foeeurope.org/foee-unconventional-and-unwanted-the-case-against-shale-gas-sept2012

UNCONVENTIONAL FOSSIL FUELS

Having reached the peak of conventional oil production, companies have extended their hydrocarbon frontiers into UFF. Heavy crude oils, coal bed methane, tight gas, shale gas and shale oil, among others, make for a wide variety of possibilities, all of which are more risky,[2] polluting, expensive, and have lower energy returns than conventional fossil fuels.

The main method to exploit unconventional gas is 'fracking', a name given to a technology that has spread across the United States since 2005. Each fracking operation requires the use of millions of gallons of water and numerous chemicals, many of which are toxic, produces large amounts of toxic and heavily polluted flowback waste water and consumes vast areas of local land. These industrial operations have also had an detrimental impact on local communities, as they can damage the environment and people's health, increase competition for land and water, destroy regional economies, damage infrastructure and affect local culture.

In order to fight climate change and keep the already rising global temperature below a two degree increase (the internationally agreed point of no return for the climate crisis), most known fossil fuel reserves must be kept in the ground. With this in mind, the exploitation of UFF represents a huge risk, given the strong climate impact, which in the case of fracking is due largely to methane leakages. Several studies have demonstrated that the extraction of unconventional gas is much more polluting than conventional gas; some conclude that it could be comparable to, or even dirtier than coal (Shindell et al, 2012, Howarth et al 2012, Pétron et al 2012, Karion et al 2013, Miller et al 2013, Brandt et al 2014, Caulton et al 2014). Contrary to the greenwash of UFF producers, the current evidence makes it impossible to speak of shale gas as a bridge fuel towards more sustainable energy sources or as a sustainable replacement for oil and coal.

The dire consequences seen in the United States, the country that has the longest history in the UFF sector, has led to a growing opposition to fracking all around the world. From country-wide bans (e.g. France and Bulgaria) to regional moratoriums (e.g. Quebec, New York, and parts of Spain, the Netherlands and Germany), widespread concerns and objections to fracking are growing into a global movement against the extraction of UFF.

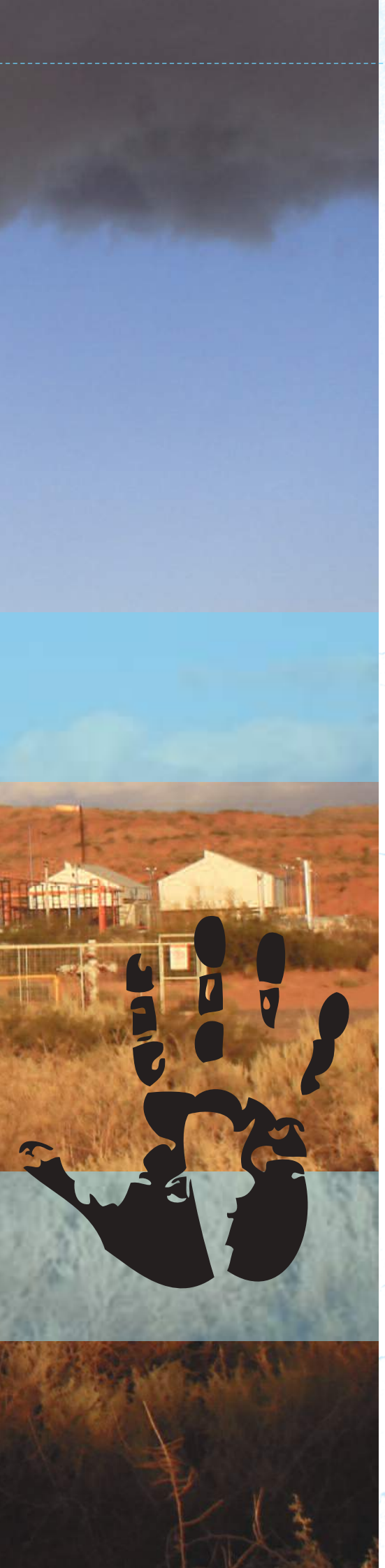
THESE INDUSTRIAL OPERATIONS CAN DAMAGE THE ENVIRONMENT AND PEOPLE'S HEALTH, DESTROY REGIONAL ECONOMIES AND AFFECT LOCAL CULTURE.

1

ARGENTINA: AN UNCONVENTIONAL POWER

Yacimientos Petrolíferos Fiscales (YPF) is an Argentinian State-owned company that for decades defined a particular logic to the appropriation of oil revenues. From its inception in 1929 to its privatization starting in 1990, the company virtually monopolized the Argentinian market, creating a strong identity with over 50,000 workers, and in many cases building entire villages. With its privatization however, when Repsol purchased 98% of the company shares in 1999, these villages suffered from deep economic and social crises.

YPF drilling pad in the Vaca Muerta basin.
© Observatorio Petrolero Sur



The partial re-nationalization of YPF, finalized in May 2012, aimed not only to sustain the country's expensive social welfare policies, but also to drive the development of UFF.

The first section of this report will present the conditions and process that facilitated the development of UFF in Argentina.

THE NATIONAL CONTEXT

The Energy 'Crisis'

In 2011, Argentina saw the end of a long period of surplus in its energy trade balance, with a deficit of US$ 3.4 billion. This followed a trend of increasing energy imports since 2002, prior to which energy represented an insignificant part of national imports. By 2011 however energy represented 12.7% of Argentina's total imports (Pérez Roig, 2013).

Although part of the reason for this was an increase in energy consumption, growing by 30% between 2001 and 2011, the primary cause was the steady decline of domestic fossil fuels production. This trend was a crucial one for the Argentinian economy, which has a primary energy mix of 90% fossil fuels, mostly gas.

This declining trend in production was largely due to the natural maturation of Argentina's conventional fossil fuel reservoirs, but also went hand in hand with an increased focus on exports. **From 1989 to 2001, oil production increased by more than 66% while, in an unprecedented move, exports quadrupled**. In the case of gas, the production boom occurred just after the construction of gas pipelines for exports, which represented up to 14% of the extracted gas at its peak in 2004 (Pérez Roig, 2013).

These changing trends did not however come about by chance; they were the consequences of a paradigm shift in the industry since the neoliberal reforms of the early '90s. With privatization, hydrocarbons ceased to be considered as a strategic resource, and soon became a commodity to be merely cashed in on.

THE ARGENTINEAN ECONOMY [...] HAS A PRIMARY ENERGY MIX OF 90% FOSSIL FUELS, MOSTLY GAS.

Extraction site on the Mapuche Gelay Ko community's territory .
© Observatorio Petrolero Sur

The Neoliberal Model Emerges

The dismantling of public enterprises,especially YPF, in the early '90s corresponded to major changes in the extraction regions. YPF had formerly guaranteed employment as well as a series of very particular rights and insurances for its workers. During the privatization process, some estimates show that nearly 85% of staff, about 50,000 employees, were fired (Muniz Terra, 2008).

Over the course of a decade, private capital pushed for legal and policy changes intended to strengthen their role as planners, regulators and managers of the country's resources. At the same time, while the oil and gas sector was liberalized, the national public sphere was stripped of most of its specific mechanisms for strategic decision-making and income appropriation. This severely reduced its capacity to negotiate with the corporate sector. For example, between 1996 and 2001, out of a total fossil fuel revenue of US$ 15,642 billion, oil companies accrued 50% of it, the Argentinian state 29.5%, the provinces and refiners 12.7% and consumers only 7.94% (Mansilla, 2007).

In 2011, 72% of the oil produced in Argentina was extracted by four companies: Repsol-YPF, Pan American Energy (a joint venture between CNOOC, Bridas and BP), Petrobras and Chevron. 83% of the gas was produced by five companies: Total, Repsol-YPF, Pan American Energy, Petrobras and Apache. Four companies, Repsol-YPF, Shell, ExxonMobil and Oil Combustibles, were furthermore responsible for almost 87% of the refinement activities (Secretary of Energy).

Another part of the picture however is that because ownership of the subsoil was transferred to the provinces, they became direct interlocutors of the industry. They were also bestowed with the policing power over hydrocarbons-related production and environmental matters. Nationally however, this generated a disintegration and decline in negotiation capacities: small provinces with small budgets were effectively forced to agree with major oil and gas companies. The provinces, lacking the necessary financial resources and in need of compensation for their recurring budget deficits, became reliable allies of the oil and gas companies.

Pumping equipment on a Mapuche territory, Nequén.
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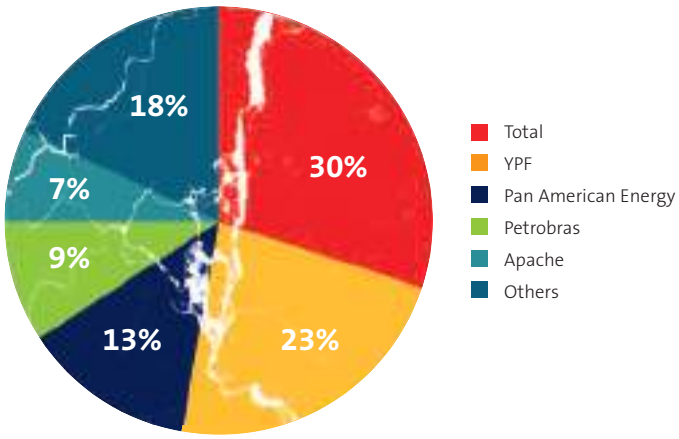
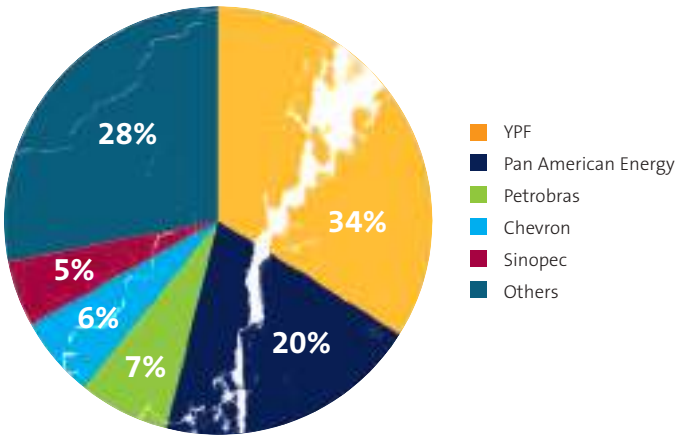
GAS PRODUCTION (2011)



OIL PRODUCTION (2011)



Source: *Secretary of Energy of Argentina.*

The Re-Nationalization of YPF

The substantial deficit in the energy balance explains the change of political direction taken since 2012. Following a government initiative, with significant popular support, the Congress passed a law entitled 'Hydrocarbon Sovereignty' (No 26.741). With this regulatory decree (1277-1212) the **national government tried to regain and centralize strategic and policy decision-making processes for the energy sector**.

This legal package led to three important changes: (1) it declared the sector to be of national public interest and defined energy self-sufficiency as a priority aim for the country; (2) it repealed laws giving the market a self-regulatory capacity; and (3), it expropriated 51% of YPF shares to carry out the guiding principle of the law, to achieve self-sufficiency.

However, at the same time, some decisions were taken that conflicted with the public company's new goals, decisions which enabled YPF to continue acting as a private, profit-seeking company that puts the interest of its shareholders before the public interest. On the one hand, obtaining exportable surpluses to improve the balance of payments was defined as a strategic objective. On the other hand, YPF retained its status as a limited company, with the objective of generating revenues for shareholders. The government also promoted the idea of partnerships with other companies, regardless of their origin or status (e.g. public, private or mixed).

Furthermore, territorial disputes as well as complaints about environmental degradation were routinely not taken into account in YPF's activities, and most crucially, **the go-ahead was given to open-up the market to unconventional fossil fuels**.

Drilling equipment on the Loma Campana concession owned by YPF and Chevron.
© Observatorio Petrolero Sur

3 1 Tcf = 28 billion cubic meters.

UNCONVENTIONAL FOSSIL FUELS: LEADING THE WAY TO DESTRUCTION

Big oil and gas corporations are leading the development of UFF, and at the national level they drive the objectives to be reached. The public sector adapts as much as it can and, in the best cases, fights to obtain revenues from UFF exploitation.

First Public Announcements

The first announcements to slowly introduce UFF into the public agenda of Argentina were made in October 2009, by **Repsol-YPF**. The company announced that it would invest in shale gas in the Loma La Lata field, in the province of Neuquén. The following year, **the North American company Apache drilled the first horizontal multi-fractured well in Latin America** (Petrotecnia, 2011a). Neither the press nor the industry mentioned a crucial aspect of these first operations: both developments took place on indigenous communities' territories, Kaxypayiñ and Gelay Ko respectively.

In April 2011, the emergence of UFF in Argentina was given another dimension when the US EIA (Energy Information Administration) published a study placing Argentina third in technically recoverable shale gas resources, following only China and the USA, and estimating it to have 774 trillion cubic feet (TCF).[3] In June 2013, the EIA released another study which confirmed the leading position of the country in global shale gas and shale oil resources. According to this report, the **Vaca Muerta formation has the highest UFF potential outside of North America**. In the following months, nearly all South American countries announced their intentions to explore their UFF potential.

Even though the EIA consultants reiterated that their findings were just the first steps and resulted from a superficial and general study, the impact on the country's political agenda did not take long to be felt. The dash for UFF ignored reports questioning this scenario of abundance and alerts about the environmental risks of its exploitation.

A Regulatory Framework adapted for the Private Sector

The oil and gas industry is not only concerned with the amount of resources potentially and technically recoverable, but also with the political decisions that impact the sector. **This is why the industry has been pushing for policies to defend its autonomy and to obtain higher prices, which are set by the National Government, presenting them as necessary conditions to invest in the country**. The Argentinian Government has responded favourably to these requests by modifying and adjusting their policies and regulations. Outlined below are the main political decisions related to UFF, all of them demanded by the oil and gas industry:

- **Prices and subsidies increase:** Through different programs, companies were able to obtain important incentives and subsidies. Nowadays, the gas price in Argentina is around US$ 7.5 per million British Thermal Unit (MMBTU), almost 300% more than the "old" gas price (Scandizzo, 2014). Since 2011, prices have gradually increased.

- **Costs reduction:** one of the industry's bottlenecks is equipment availability for new operations. This is why taxes on imports of capital goods have been lifted (in a period of economic crisis, when imports are strongly controlled for all sectors and types of products). Moreover, the National Government committed to invest one billion pesos (€ 135 million) for road infrastructure and services in the northern part of the Neuquén province.
- **Retentions reduction:** Since 2002, companies have managed to reduce the revenue percentage of the National Government for oil and gas exports.
- **Closure of the dispute with Repsol:** Repsol filed several complaints after the partial nationalization of YPF. Several groups from different sectors (including Repsol shareholders such as La Caixa and Pemex) called for a conflict resolution in order to do business with YPF. Recently, the National Government agreed on the payment of a compensatory amount of US$ 5 billion in bonds.

July 2013 marked a turning point for these various measures and demands, with the publication of National Decree 929, which instated the framework demanded by companies. This decree created the *"Régimen de Promoción de Inversión para la Explotación de Hidrocarburos"* (Investment Promotion Regime for Hydrocarbons Exploitation) for projects aiming at investing more than US$ 1 billion.

Key points of the Decree 929:

- After five years of production, 20% of the extracted reserves will be traded at international prices both in the international and local market. If these reserves are exported, they are exempted from all customs taxes.
- The Decree creates the status of Unconventional Exploitation Concession. The creation of new unconventional areas is facilitated by the subdivision of the already existing concession areas and the fusion with other ones from the same holder. This allows companies to start unconventional projects without having to go through new tender processes.
- Automatic extension of concession terms to 35 years, which violates Hydrocarbons Laws that establish a maximum of 25 years.

Finally, the sector has launched a *'communications war'*, as it was dubbed by the governor of Neuquén. The industry spends millions of dollars on greenwashing and advertising in mass media, websites, leaflets, etc. However, as we will see later, the intensive industry lobby efforts to communicate on issues around the improvement of extraction conditions have never been accompanied by a push for actual improvements in terms of environmental protection or increased public participation.

Key role for YPF

So far no progress has been made to adapt environmental regulation to the development of UFF, as no norm has been established nationally. Local legislation has not been matched to international requirements for prior, free and informed consultation with indigenous communities regarding proposed new developments.

Following its re-nationalisation, YPF's appointed Miguel Galuccio as its director, a former official at Schlumberger, one of the leading services companies in the unconventional sector. According to its five-year plan, YPF's short-term goal was to reduce imports, in the medium term to reach self-sufficiency, and in the long term, ***"to turn Argentina into a net energy exporter"***. In pursuit of these goals, the company proposed to improve the recovery techniques of mature fields, to develop its refining capacity, to expand production zones to high-risk areas (onshore and offshore) and, finally, to massively develop unconventional fields (OPSur, 4/11/2012). The company projects that by 2017, **investments in UFF should represent 40% of total investments** (YPF, 2012).

In its ambiguity, YPF has not only acted as a bridge between the Government and private companies, but has also successfully promoted some private sector wishes: YPF boosted subsidy programs and secured the increase of wellhead and fuel prices. This strategy enabled YPF to fund up to 70% of its required investment into UFF, while the other 30% would come, among other sources, from teaming up with private companies, like Chevron (OPSur, 4/11/2012). As a result, YPF is the most advanced fracking company in Argentina and has become the symbol of the country's UFF development. Whilst most of the drilling is taking place in the Neuquén Basin, as will be seen later, other areas have also been targeted, such as the D-129 formation on the Golfo San Jorge Basin.

Demonstration of a Mapuche group in front of a conventional well owned by Apache.
© Observatorio Petrolero Sur

EMERGING "FRACK-FREE" ZONES

UFF are presented as a *necessary evil* in Argentina's 'crisis' context, which attempts to forestall in-depth discussions or criticism about its exploitation. Nonetheless, a counter-movement has been developing, resisting UFF operations and urging alternative energy solutions. In early 2012, this growing resistance was intensified thanks to the rapid dissemination of information about fracking operations, and the sharing of experience from years of struggles to protect socio-environmental rights against mega-mining projects, agribusiness and urban expansion. Furthermore, the major opposition and complaints that the UFF industry was facing in many parts of the world acted as a basis for a new frontline mobilisation against fracking in Argentina, as will be seen in the case of Neuquén,.

One of the key strategies of the resistance movement has been to promote the enactment of local regulations that prohibit fracking. One year after the first such measure was approved (December 2012) in the Patagonian province of Río Negro, more than 30 similar local decrees had been registered across the entire country. In some cases, these decrees emerged from popular initiatives and social organizations and, in others, from local councillors.

One striking case was the response to a fracking prohibition in the city of Allen, in the province of Río Negro. In this pear farming region, intensive drilling activities were already taking place in the middle of the orchards. The local population – organized in assemblies and associations of fruit farmers - pushed the local council to approve a decree prohibiting fracking. A few days later, the provincial authority filed a complaint against this decision to the Supreme Court of Justice. The Court quickly accepted the regional government's complaint, against the local population's will.

Cases of collective mobilizations, fracking prohibition and court actions have since multiplied. One thing they repeatedly show is that the fight against the UFF industry is not restricted to ecologists, environmentalists or conservationists, nor is it focusing solely on the economic aspects.

CHRONOLOGY OF THE RISE OF SHALE GAS IN ARGENTINA

1990's	• Neo-liberal state reform and YPF privatization, bought by Repsol. • Negative energy trade balance, increase of energy exports. • Constitutional reform: natural resources control transferred to provinces.
End of 2009	• First Repsol-YPF announcements about shale gas projects.
2010-2011	• First gas producer of the country, Total, becomes a major UFF actor, with 11 permits, including 6 as operator.
Early 2011	• First unconventional multi-fractured wells drilled by Apache. • One study by the US EIA ranks Argentina as having the world's third biggest UFF potential.
May 2012	• YPF renationalisation with conflicting objectives of self-sufficiency and increase in exports, emphasising UFF. • Partnerships with foreign companies are encouraged for UFF production.
December 2012	• First local decree prohibiting the use of fracking.
July 2013	• National decree 929: regime promoting UFF investments and offering important benefits to oil and gas companies. • The following day, the first agreement between YPF and Chevron.

2

THE BOOM OF UNCONVENTIONAL RESOURCES IN NEUQUÉN

The Neuquén Basin extends from the South of the province of Mendoza, to the West of La Pampa, Neuquén and Rio Negro. 92% of its 124,640 km² belongs to the province of Neuquén. This basin is the primary area of conventional hydrocarbon production in Argentina: it generates almost 40% of nationally produced oil, 50% of gas, and is the focus of almost all new investments into UFF.

According to Argentinian law, the provinces have control over their subsoil resources. In other words, they are responsible for granting exploitation permits. Recently, Neuquén has faced a steep decline in its hydrocarbons production, mainly due to the depletion of its mature conventional reservoirs. UFF therefore has been presented as the solution and strongly promoted by the government. There are now 155 operating shale oil and shale gas wells, while 323 new wells are set to be drilled in 2014 (Rio Negro, 28/12/1013).

This however is only the tip of the iceberg, and much more is at stake. According to the US EIA report of June 2013, out of the 802 TCF (trillion cubic feet) potential resources attributed to Argentina, 583 TCF are in the Vaca Muerta and Los Molles formations. These early analyses, and results in the Neuquén Basin, have encouraged companies to invest more heavily, and already existing infrastructure in the region has allowed for quick development of operations (Credit Suisse, 2012).

Protected natural area of Auca Mahuida, Neuquén.
© Sergio Goitia

INACCESSIBLE PUBLIC INFORMATION

Access to public information in Argentina is an administrative burden, especially in Neuquén, despite this right being enshrined in international law, a national decree and the national environmental regulatory framework. The environmental reports for unconventional wells mentioned in this report were obtained thanks to the actions of the Protected Natural Areas Agency, by the provincial member of parliament Beatriz Kreitman and by residents affected by Total activities.

PROVINCIAL CONTEXT

Landscape and geography

The Neuquén Province is made up of two major natural regions, the East and the West. In the Eastern region, low and variable precipitation has resulted in years of drought that threatens the activities of small livestock, Criollos and Mapuches farmers. This is where the main shale formations are located.

There are three main hydrological sources in the region, namely the Colorado, Neuquén and Limay rivers, but beyond their lush surrounding areas, the region is very arid.

From a geological perspective, there are five hydrocarbon zones in the Neuquén Basin that may contain shale resources: Precuyano, the lower and upper Agrio formation, and the two most significant formations, Vaca Muerta and Los Molles, which cover more than half of the province (Chebli et al, 2011). Vaca Muerta, the region with the highest UFF potential, has a low population density, with fewer than three people per square kilometre. It is however the provincial region that has grown most in recent years, mostly because of the increase in hydrocarbon activities, which compete with the traditional small livestock farming activities. After the 1990s deregulation, oil and gas production very quickly developed in this area. Vaca Muerta sits on one of the biggest gas fields in Latin America, Loma de la Lata, operated by YPF, and on one of the main oil fields in the country, El Trapial, currently operated by Chevron.[1]

THE CONTINUOUS INEQUALITIES ASSOCIATED WITH THIS INDUSTRY LINK THE PROVINCE WITH WHAT SOME CALL THE "HYDROCARBONS CURSE"

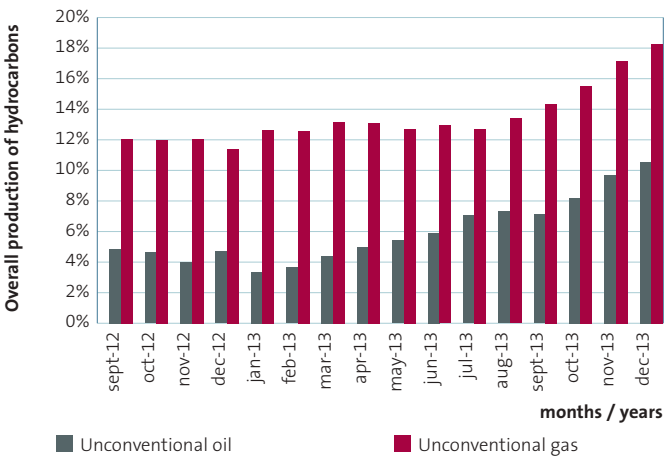
1 See map at the end of this chapter.

History, identity creation and energy dependency

At the end of the nineteenth century, the National Government consolidated its power in this region through bloody military operations against the Mapuche community. The survivors developed different strategies to remain in their region; private ownership, occupation of public lands, and the creation of collective settlements. Simultaneously, other social groups settled in the region, alongside state development. Since 1960 its population has steadily grown and in 2010 the province registered around 551,000 inhabitants.

The political party **Movimiento Popular Neuquino (MPN) has held power at the provincial level since the early 1960s, having won consecutive elections**. The MPN's political line is in opposition to the National Government, which has contributed to the creation of a particular 'Neuquén identity' (Favaro, 2001: 19). Since the development of the conventional Loma la Lata field, discovered by YPF in 1977, the province has associated its image with hydrocarbons activities (Favaro, 2001).[2] The Argentine economy is structurally reliant on royalties from the fossil fuel sector (Petruccelli, 2005) and in 2008 47.6% of the gross provincial product came from the extracting sector, mainly hydrocarbons (Giuliani, 2013: 135). Because of the way fossil fuels are locked-in, analysts define the province's economy as an enclave; it involves minimal linkages with other sectors, weak demand for jobs, and the benefits flow out of the region. This is a classic pattern for multinational oil and gas corporations, who are the main operators in the region (Giuliani, 2011). Although social indicators are better than in other provinces, the continuous inequalities associated with this industry link the province with what some call the "hydrocarbons curse".

PRODUCTION OF UNCONVENTIONAL FOSSIL FUELS IN NEUQUÉN



Source: *Ministry of Energy and Public Services, Neuquén Province, 2014.*

THE UNCONVENTIONAL FOSSIL FUELS PROTAGONISTS

A wide range of actors have contributed to the promotion of UFF developments: the National and Provincial governments, joint ventures with state-owned enterprises, and private companies, both multinational and, to a lesser extent, national.

Provincial government

Provincial budgets have been suffering from a significant decline due to the decrease in recent hydrocarbon production: while royalties represented 46% of overall revenues of the Neuquén Province in 2007, this proportion decreased to 28% in 2011 (Giuliani, 2013: 174). However, this income is vital for the provincial coffers. The push for UFF, helped by the partial re-nationalization of YPF, was strongly welcomed by the province, which became one of the primary promoters of this 'solution' to the 'energy crisis'.

Faced with growing concerns about environmental issues, the province created new regulations for hydrocarbons production. The use of water, a crucial resource for fracking, was regulated in August 2012, with the *"Standards and procedures for the exploration and exploitation of unconventional reservoirs"* (provincial Decree No. 1483). These standards allow for the use of surface water and prohibit the use of groundwater, unless it is not drinkable. Moreover, the standards require the reuse of flowback water, or its final storage in a disposal well. Parallel to this, the government widely disseminated figures downplaying the amount of water necessary for the process: their estimation showed that only 0.1% of the Neuquén River's flow would be used for fracking.

Designed to reassure the population, this Decree actually created new problems, as detailed by several peer-reviewed scientific studies from renowned US Universities. At present, it is widely recognized that each fracking operation requires the average use of 15 million litres of fresh water, whilst only a tiny fraction of the water returns to the surface with flowback.[3] Therefore, even if the flowback water is reused, the need for fresh water will remain constant and extremely high. Furthermore, the issue of final re-injection of flowback in disposal wells is also controversial, as it could be the source of important seismic activities. In the USA, several independent academic studies (Keranen et al, 2013; van del Elst et al, 2013; Ellsworth et al, 2013; Sumy et al, 2014) have demonstrated that re-injection of flowback had caused significant earthquakes, even in seismically inactive regions.[4]

2 In 1929, oil was obtained for the first time in the province, where the city of Huincul now sits. Since then, the relative importance of this industry has gradually risen.

3 In 2013, studies of the U.S. Geological Survey (USGS) (Kappel and Zoltan Szabo, 2013) and Downstream Strategies (Hansen and Mulvaney, 2013) confirmed that on average, only 10% of the water used returns to the surface.

4 While the scientific community considers the seismicity risk during fracking operations as limited (but not absent), the risk is much higher with flowback re-injection wells. Among dozens of other cases, it was confirmed that an earthquake with a 5.7 magnitude which occurred in November 2011 in Oklahoma was triggered by a project of injection of fracking flowback. It caused the destruction of 14 houses.

Several months after this Decree, in April 2013 the Neuquén Province amended Law No. 1875, on *"Preservation, Conservation & Protection of Environment"*, making the conditions required to run UFF projects more flexible, and in turn weakening the whole process. The revised law replaces the obligation to submit an Environmental Impact Assessment study with the requirement for a more simple and less stringent Environmental Report (provincial Decree No. 422). In practice, this eliminates the requirement for public hearings. This legislation clearly shows the provincial authority prioritising corporate needs over the public interest.

The increasing lack of public participation during project approval is combined with the job insecurity faced by workers from the State's Secretariat of the Environment and Sustainable Development. This body is supposed to wield the powers of an environmental policing agency but does not have the operational capacity to perform its mission adequately. It currently has 131 employees, 106 of which hold precarious short term contracts, with contract extensions depending solely on the Provincial Government's will.

The provincial authority has nonetheless been forced to adapt its legislation intended to assess the risks and impacts of UFF activities, towards better monitoring and regulating the industry. 2014 has seen the province discussing three new laws:[5] a new *'Provincial Hydrocarbons Law'*, a regulation on *'Environmental Protection for the exploration and exploitation of unconventional reservoirs'*, and what the main legislative innovation, the *'Social, environmental and community responsibility regime'*, which would push companies to invest a proportion of their income into local environmental and community benefits.

Meanwhile, Neuquén Governor, Jorge Sapag, has been proudly boasting of his achievements in spreading unconventional oil activities. In November 2013, in a speech to the Oil Club, the Governor said that in Neuquén, 400 UFF wells were already being drilled and that almost 10% of the province's oil production was coming from that source (Sapag, 12/11/2013). The legislation regulating these activities, however, has not yet been discussed.

Territory of the Mapuche community Gelay Ko, Neuquén.
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Public private joint ventures

Neuquén authorities discovered a way to build up their oil and gas revenues, by creating an public energy utility company which effectively operates as a private, profit-seeking corporation: Gas y Petroleo del Neuquen SA (GyP). The company has already signed joint-ventures with Wintershall, Petrobras and Shell.

GyP's main role is the holding of exploitation permits.[6] **The province pulls all the strings to achieve higher returns for itself: it legislates, grants permits to itself, controls the operations, earns profits from the income and curtails public participation**. This obvious conflict of interest raises a number of concerns, notably about the 'real' intentions to control the UFF industry and limit its environmental impacts. Especially when the main priorities of the government seem to be seeking to both offset the depletion of conventional reserves, while simultaneously increasing production levels in a time of economic crisis. This is all the more relevant knowing that GyP has awarded (through direct contracts without formal tendering processes) permits to private companies like Total, Shell and Pan American Energy.

The new YPF management has also been looking after its private partners' interests, supporting their objective of massively developing the country's UFF potential. YPF states that more than 150 UFF wells have already been drilled in Vaca Muerta, 19 drilling rigs are in operation, and the average daily production is now above 20,000 oil and gas barrels (YPF, 18/02/2014).

The first real success of the new YPF management was the agreement founded with Chevron, in which a new legal framework was established to better reflect corporate demands. YPF also recently bought Apache,[7] the fifth largest gas producer in the country. This acquisition allowed YPF to become, together with Total, the main gas producers in the country. This position was consolidated with the company gaining ownership of the largest production area in the Neuquén region, of some 15 000 km². Despite this, the partly re-nationalised oil and gas company has not obtained the investments it was expecting, mostly due to its unsuccessful battle against Repsol,[8] following the company's re-nationalisation. In February 2014 however, according to the YPF management, an agreement with Repsol was finally reached, lifting the obstacles in attracting new investments (Télam, 02/25/2014).

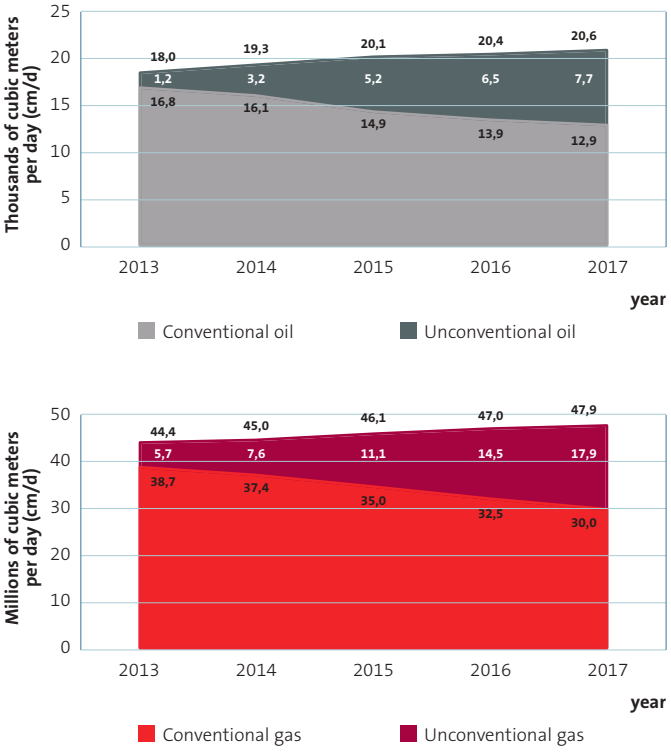
Furthermore, YPF, in coordination with the national government, has been working towards reducing tensions with civil society through huge investment in corporate social responsibility (CSR), and agreements with the provincial government.[9] The provincial government has made multiple announcements about how this CSR fund would be spent; purchasing machinery, investments in rural infrastructure, and even funding for a forensic laboratory sponsored by the FBI! (Neuquén Informa, 02/24/2014).

5 The drafts of these laws had still not been officially presented, at this report's time of writing when that report was written, in April 2014.
6 In mid-2013, GyP owned 73 areas, of which 54 were active: three under exploitation license and 51 with exploration permits (Ministry of Energy and Public Utilities, 2013).
7 Apache was operating in Argentina since 2001 and was present in Neuquén, Rio Negro, Tierra del Fuego and Mendoza. The operations in the Anticlinal Campamento and Loma Negra areas affected indigenous territories. No public consultation was organised, violating the ILO Convention n°169. Today, in the Fernández Oro Station area (town of Allen, Rio Negro), it is exploring conventional and unconventional tight sands reservoirs. The affected area is one of the main orchards of the country. In its permit of Alto Verde (Mendoza), Apache conducted seismic tests in the middle of vineyards.
8 Repsol found some support from other multinational oil and gas companies, and claimed for US$10 billion in compensation from the International Centre for Settlement of Investment Disputes (ICSID)
9 In Loma Campana, Chevron and YPF committed to pay about 350 million pesos to the province for CSR activities.

Transnational operators

The recent UFF developments in Neuquén are mostly based on a network of interconnected actors *"whose commands are highly concentrated and centralized in the hands of a core group of transnational companies with both regional and global strategies"* (Landriscini, 2008). In the Neuquén Basin, the areas with highest potential were licensed to major multinational companies such as YPF, Petrobras, Chevron, Total and Pluspetrol. Other actors also stand out for the vast areas of land they own. Amongst them we find companies such as Pluspetrol, GyP, ExxonMobil, Jet, PAE (joint venture between BP, Bridas and CNOOC), Wintershall and Shell (Credit Suisse, 2012).

FORECASTS OF THE DAILY PRODUCTION OF HYDROCARBONS IN NEUQUÉN



Source: *Ministry of Energy and Public Services, Neuquén Province, 2014.*

SOCIAL MOVEMENTS AGAINST FRACKING

The short history of Vaca Muerta is similar to other extractive territories, where small companies managed to open up and pave the way for subsequent sales to major companies. In this way, all the main multinationals (e.g. Shell, Total, ExxonMobil) purchased or increased their participation in Vaca Muerta since 2011, opening it up to global oil and gas markets.

The UFF developments do not however take into consideration the previous impacts of the oil and gas industry.[10] In Neuquén, the industry faces opposition from three types of organization: indigenous populations, social and environmental movements, and trade unions. In a province where oil and gas production has long been the tradition, this degree of opposition against such a major regional activity, which generates many direct and indirect jobs, is both unprecedented and revealing.

One of the longest-standing conflicts is between the Mapuche community and fossil fuel and UFF operators. This stems from the unsolicited occupation of Mapuche territory. After the military occupation of the late nineteenth century, the native communities were displaced to outlying areas, where, in many cases, the arid conditions made life extremely difficult. Eventually however, oil and gas companies also wanted to occupy this unfriendly but carbon-rich territory. Today, according to a survey conducted by the Centre for Human Rights of Indigenous Peoples, more than a third of the communities in the province are directly affected by struggles relating to oil and gas permits granted on their territories (Scandizzo, 2014).

One iconic case concerns the Kaxipayiñ and Paynemil communities, whose territory overlaps the Loma de la Lata area (operated nowadays by YPF), which was the main conventional gas field in the country until the late 90s. It remains one of the major gas fields in Latin America today. Members of the communities began to take action in 1996, denouncing the contamination of their drinking water, which could actually be set alight due to the high concentration of oil residues. Through the occupation of industry facilities, demonstrations and legal actions, they began a struggle that has continued to the present day. A legal action has even been launched against the national government. The case came before the Inter-American Commission on Human Rights. In 1998, the province of Neuquén was convicted of failing to provide safe and sustainable water and a healthy environment for communities.

During this long process, the laboratory of the National University of Comahue refused to conduct water testing, in order not to lose its funding from Repsol-YPF. The Ministry of Health for the province took measures to hide early studies with alarming results.[11] Furthermore, and on several occasions, the government refused to undertake health impact studies (Gavaldá and Scandizzo, 2008). The studies, which then clearly showed the negative impacts on the health of indigenous communities, were conducted only thanks to a collective struggle.[12]

10 When YPF was re-nationalised, many officials tried to quantify the damages generated by Repsol. Guillermo Coco, Minister of Energy, Environment and Public Services of Neuquén, assessed the environmental and social damages caused by Repsol-YPF activities to have cost around US$ 1,500 million (Rio Negro, 14/05/2012).

The oil and gas industry has had a significant negative impact on the Mapuche subsistence economy. This economy relies heavily on goat rearing, which is already made difficult in a dry region with limited access to water and pasture. The arrival of the oil and gas companies generated land and water conflicts. The construction of roads and large drilling sites caused deforestation and significantly contributed to desertification (Scandizzo, 2014).

This situation was publicly denounced in 2012 by United Nations Special Rapporteur on the Rights of Indigenous Peoples, James Anaya. His report highlighted *"the legal uncertainty of indigenous peoples on their traditional lands"*, especially in the face of industrial agricultural and extractive projects. It also echoes the concerns of the communities about fracking, which he described as *"particularly risky"* (Anaya, 2012).

The problems however go beyond the local impact in these territories. On behalf of the government of Neuquén, the United Nations Program for Development (UNDP) found that 65% of the province was affected by oil and gas exploitation. It assessed the damages caused between 1991 and 1997 to have cost around US $ 900 million. In addition, the study showed that the 550,000 most affected hectares were within areas owned or operated by YPF (then Repsol-YPF, now YPF again), Perez Compac (then Petrobras) and San Jorge (later Chevron), and that the damages made there were estimated to be around US $ 350 million. The acknowledged environmental damages, especially those in the oil and gas production areas, were so severe that the then governor, Felipe Sapag, recognized for the first time a severe environmental emergency and declared it be a state of emergency (Sejenovich, 2012: 80).

However, no concrete measures were taken and the environmental impacts were gradually forgotten. The situation has since deteriorated. In June 2000, the then governor, Jorge Sobisch, extended the concession for Repsol-YPF in Loma la Lata by 10 years, basing his decision on a promising "strategic partnership". And recently, as noted above, the current provincial authority has compounded the issue by weakening environmental controls.

Argentine civil society has fought for over a decade against projects concerning mega-mining, agribusiness, pulp mills, etc., which has in no small way built up their capacity to rise up and take action against UFF. These social movements are structured in assemblies that emerged during the Argentinian economic crisis in 2001, when harsh confrontations took place in Patagonia and Neuquén.

The trade unions have also made demands which play an important part in the opposition against UFF. They have a renowned history of resistance to the implementation of neoliberal policies, which they have transposed onto the struggle against fracking, organising mass demonstrations led by teachers and public sector workers.

These various resistance approaches have led to the convergence of different sectors. The Mapuche communities and organizations are fighting for a real nationalization of YPF and for the social appropriation of oil and gas incomes. Environmentalists, feminists, trade unionists, political parties, religious groups, students, intellectuals, legislators, etc., are fighting for various approaches to combat UFF, in assemblies and networks such as the "Multisectoral against Hydraulic Fracturing". With this diversity of groups, ways of combating UFF vary, from occupation of oil and gas sites and mass mobilizations to enactments of local frack-free decrees, legal complaints, and awareness-raising activities (debates, workshops, documentary screenings, concerts, etc.). These links are not always sustained over time, and ruptures sometimes occur because of ideological differences, but the collective struggle persists.

"There's no development possible in a destroyed territory."
© Observatorio Petrolero Sur

Home in the Mapuche community Gelay Ko.
© Observatorio Petrolero Sur

Members of the Multisectoral against hydraulic fracturing.
© Multisectoral against hydraulic fracturing

11 One of the studies, which was eventually released, noted, for example, that Loma La Lata has "triggered a complex chain of environmental impacts" that have worsened the living conditions of its inhabitants. There are 40 wells drilled with 37 km of pipelines, 20 km of electricity lines and 50 ha for runways. Alarming amounts of air emissions (50,000 m3/day), contamination of soil, rivers and groundwater (Lisi, 1996) were detected.

12 The study conducted by the consulting firm Umweltschutz Argentina (2001) found significantly high levels of lead, cadmium, arsenic and nickel; and it links these values with hydrocarbons. Meanwhile, Falaschi et al (2001) concluded that "the data analyzed are a serious indication that the levels of exposure to elements such as hydrocarbons in general, lead and mercury, beyond the amounts found in their bodies, represent a serious harm for physical health, aggravated by the uncertainty created by the inaction of the provincial health system which systematically denied the information".

Unconventional hydrocarbon boom in the Neuquén province

In 2011, Argentina – with an energy matrix of 90% based on hydrocarbons – had a historic deficit in it's energy trade balance. To solve this, the Government (who had partially expropriated YPF: one of the major oil companies in the country) along with the companies rapidly attempted to valorize the unconventional fields using new techniques: horizontal drilling and fracking (high pressure pumping of millions of tons of water, sands and chemicals). These techniques have been denounced globally due to the devastating environmental, climate and social harm caused. According to the US Government, the Vaca Muerta and Los Molles formations hold the highest UFF potential beyond North America. At present, 400 wells have been drilled in the Neuquén Province.

Plundering Model

Since 2012, the Argentinean State together with YPF, has negotiated the expoitation of the Neuquén basin with transnational companies. These companies (Chevron, Total and Shell, amongst others) seek to maximise their profits without any consideration to the environmental or social damage caused. On the other hand, the provincial government – held since the 1960's by the Sapag family through the Movimiento Popular Neuquino (MPN) – has consistently sought to increase royalties while simultaneously seeking to suppressing protests. The provincial government as well as the powerful oil workers union have acted in favour of these transnational companies, which has resulted in an increase in flight capital.

The resistance

Resistance to the unconventional takeover has been diverse including: indigenous Mapuche communities, students, unions, teachers, workers, environmental collectives, social organisations and political parties. These groups have mobilised and organised festivals, public talks, occupied wells etc. aiming to raise awareness of the impacts of fracking caused in other places and highlighting the long hydrocarbon

history in the province has failed to bring 'development', but rather desolated the area and caused irreparable contamination.

Auca Mahuida territory is a Natural Protected Area that is rich with hydrocarbon fields. Total operates in Pampa las Yeguas, Rincon la Ceniza and San Roque areas. Shell's subsidiary, O & G Developments, operates in Aguila Mora. YPF and the provincial Gas y Petroleo also have areas that cross over the territory that hosts one of the largest biodiversity areas in arid Patagonia.

Social issues

Rupture of original cultures / Land occupation / Evictions / Social protest criminalization

Environmental issues

Biodiversity loss / Greenhouse gases / Contamination risks

Rio Negro's Upper Valley

A significant part of the hydrocarbon production, is located in the area where the Rio Neuquén joins the Rio Limay and forms the Rio Negro. It is precisely in the confluence where one of the most important fruit valleys in the country is situated. In this region of Apache, a company owned by YPF, occupies vast areas of land for the production of unconventional hydrocarbons. The municipality of Allen banned these activities, but the provincial government ignored the mobilisation of the people and allowed for further development to go ahead.

Suppression

As Neuquén's Parliament approved the first massive shale gas development between YPF and Chevron, five thousand people protested in the streets. The police responded to the mobilization aggressively using tear gas and rubber/lead bullets. The law was passed in spite of their efforts. Two days later, houses in the Campo Maripe community, whose territory crosses the areas approved for exploitation, were burnt down by anonymous hands.

Resistances

Cinco Saltos Municipality, on the bank of the Neuquén river, was the first area in the country to declare itself fracking-free. The movement has obtained bans in over 30 local towns, with Zapala being the only one to get one in Neuquén.

References

Vaca Muerta and Los Molles shale formations

Natural Protected Areas

Park rangers

Well

Fracking well

Localidades antifracking

Approved ban

Ban declared unconstitutional

Selection of hydrocarbon areas and operator

1. Centenario: Pluspetrol, **2. Lindero Atravesado:** Pan American Energy, **3. Loma La Lata:** YPF, **4. Sierras Blancas:** Shell, **5. Cruz de Lorena:** Shell, **6. Loma Campana:** YPF- Chevron, **7. Aguada Pichana:** Total, **8. Sierra Chata:** Petrobras, **9. El Orejano:** YPF, **10. Pampa de Las Yeguas – Bloque I:** Total, **11. Rincón La Ceniza:** Total, **12. San Roque:** Total, **13. Aguada Federal:** Wintershall, **14. Veta Escondida:** Petronas, **15. Bajo del Choique:** ExxonMobil, **16. La Escalonada:** Total, **17. Águila Mora:** Shell, **18. Puesto Hernández:** YPF, **19. El Trapial:** Chevron, **20. Parva Negra:** Petrobras, **21. Cerro Partido:** YPF, **22. Loma Negra:** Apache, **23. Anticlinal Campamento:** Apache.

Mapuce communities

1. Newen Mapu, **2.** Paci Pije, **3.** Wü Kayen, **4.** Kaql Ko, **5.** Kaxipayiñ, **6.** Paynemil, **7.** Campo Maripe, **8.** Kilapi, **9.** Huayquillán, **10.** Millain Currical, **11.** Cheuquel, **12.** Millaqueo, **13.** Wiñoy Folil, **14.** Tuwun Kipalmeo Mallqueo, **15.** Gelay Ko, **16.** Quinchao, **17.** Logko Purán, **18.** Antiñir, **19.** Kalfukurá, **20.** Zapata, **21.** Gramajo, **22.** Filipin, **23.** Cayupán, **24.** Marifil Linay, **25.** Wenu Xawvi Leufú, **26.** Paineo, **27.** Roms, **28.** Cayulef, **29.** Zúñiga.

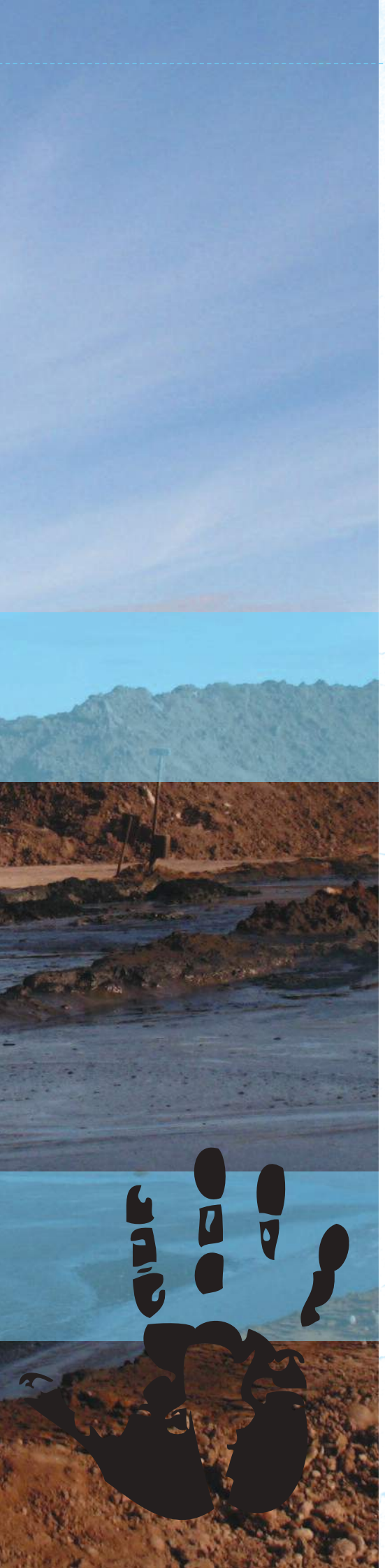
Research: Observatorio Petrolero Sur. **Design:** Iconoclasistas. **Sources:** Observatorio de Derechos Humanos de Pueblos Indígenas (ODHPI), Neuquén's Provincial Protected Areas Direction and Undersecretary of Mining and Hydrocarbons, among others.

3

SHELL, ENSURING ACCESS TO SHALE GAS IN PATAGONIA

Shell has a long history in Argentina, established there since 1914. The company is primarily focused on oil refining, controlling one of the country's largest refineries, located in the Dock Sud petrochemical complex. On the consumer market, it has over 300 service stations scattered around the country. In the past two years however, the company has changed its corporate strategy to focus more specifically on the extraction of unconventional hydrocarbons in the Vaca Muerta shale formation. Although Shell had already been pursuing gas extraction projects in the north of the country, its new investments in unconventional hydrocarbons made in late 2011 had the objective of ensuring the company a presence in all stages of the market, from gas production to oil refining to the distribution of petrol.

YPF waste treatment site.
© Ike Teuling



SHELL AND UNCONVENTIONAL FOSSIL FUELS IN NEUQUÉN

Shell's interest in shale gas in Argentina is part of the company's global strategy to ensure worldwide access to unconventional resources (Heinrich Böll Stiftung et al., 2011). To achieve this, Shell has initiated projects in the USA, Canada, South Africa, Algeria, Tunisia, Egypt, China, Australia and Ukraine, amongst others. In parallel, it has funded research centres in Europe and the USA, seeking to justify the safety of fracking and provide answers to the growing criticisms and questions about the technique (Platform, 2013).

Shell has expanded its activities exponentially in Argentina since late 2011, particularly in the Patagonian territory, following the first news about the potential of the Vaca Muerta shale basin. Shell is participating in five exploration concessions, which total about 1,000 km². So far, Shell has drilled and fractured 11 wells, 7 of which are operated by them directly, with the remaining operated by Total. In all cases, with the exception of the Cruz de Lorena concession, Shell is operating through a subsidiary known as O & G Developments SA.

In recent years, Shell formed a joint venture with the provincial company Gas y Petroleo (GyP), and the Argentine company Medanito, but still retained a majority in the share package, as well as in the operations. This venture aimed to explore the Sierras Blancas (166 km²) and Águila Mora (176 km²) concessions in Río Negro (15/12/2011). Meanwhile, in March 2013, Shell bought the Cruz de Lorena concession (158 km²), close to Sierras Blancas, and then signed an agreement with GyP to drill three exploratory wells (Río Negro 29/3/2012). In March 2014, Shell acquired 42.5% of the La Escalonada (241 km²) and Rincón la Ceniza (221 km²) concessions from Total, though Total still operates with 42.5% ownership, the remaining 15% being owned by GyP (El Inversor Online, 31/03/2014).

Drilling tower in Ricón la Ceniza.
© Ike Teuling

Entrance to Aguila Mora.
© Ike Teuling

SHELL RECENTLY ANNOUNCED A TRIPLING OF ITS SHALE GAS INVESTMENT IN THE AREA, RISING TO US$ 500 MILLION BY 2014

LIST OF UNCONVENTIONAL HYDROCARBONS' CONCESSIONS OWNED BY SHELL

area	Águila Mora	Sierras Blancas	Cruz de Lorena	La Escalonada	Rincón La Ceniza
holder	GyP S.A (100%)	GyP S.A (100%)	GyP S.A (100%)	GyP S.A (100%)	GyP S.A (100%)
shareholder	GyP (10%) – Medanito (22,5%) - O&G Developments LTD S.A (67,5%) [Contract UTE with G&P before 2009]	GyP (10%) – Medanito (22,5%) - O&G Developments LTD S.A (67,5%) [Contract UTE with G&P before 2009]	GyP (20%) - O & G Developmets LTD S.A (40%) - Shell Compañía Argentina de Petroleo S.A (40%) [Contrat UTE]	GyP (15%) - Total Austral S.A (42,5%), Shell (42,5%) [Contract UTE]	GyP (15%) - Total Austral S.A (42,5%), Shell (42,5%) [Contract UTE]
operator	O&G Developments	O&G Developments	O&G Developments	Total	Total
term of contract	19/01/2027	19/12/2016	19/08/2016	13/07/2014	13/07/2014
area (km²)	176	166	158	241	221

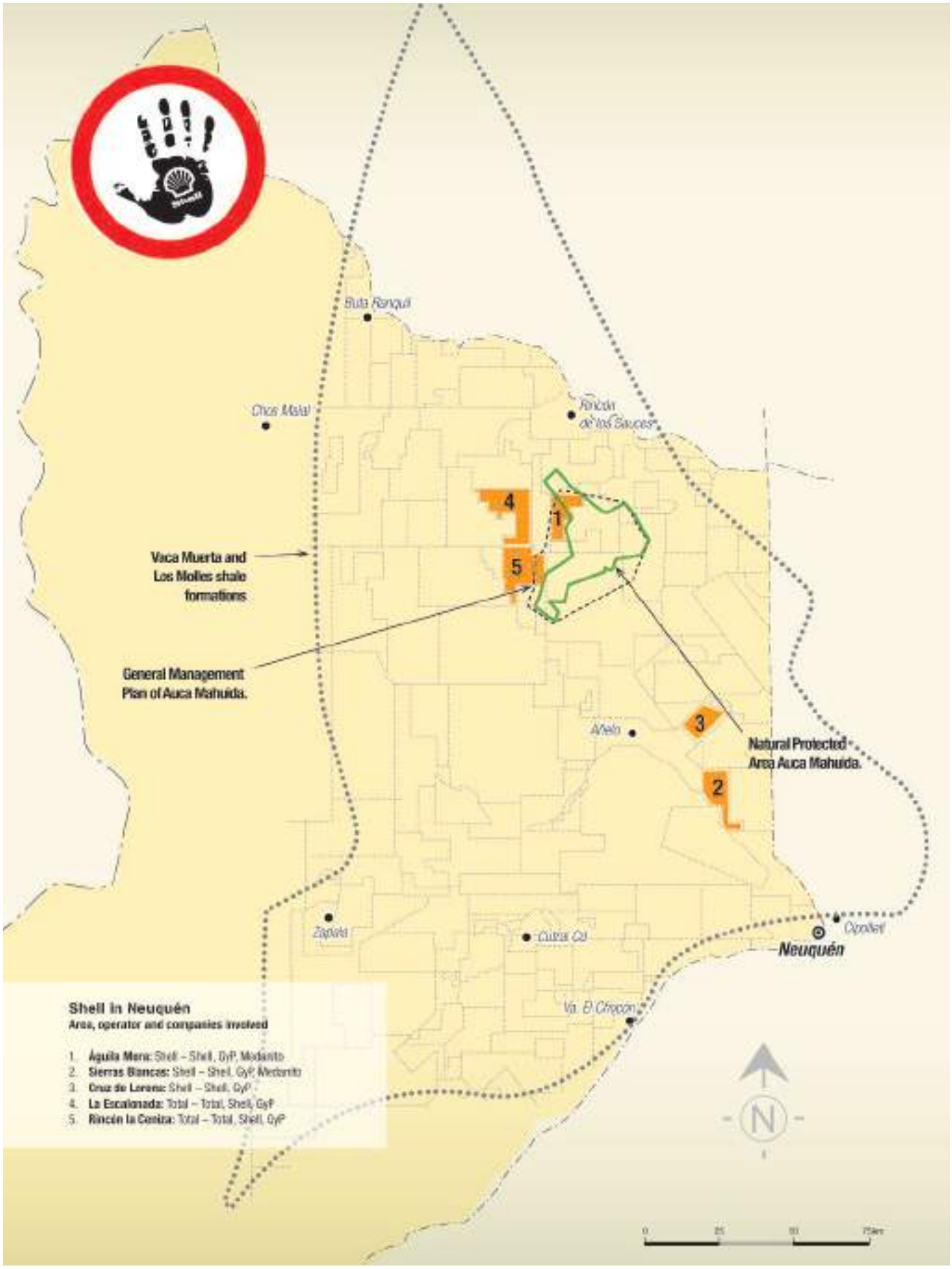
By mid-2013, Shell reported successful UFF extraction from its Sierras Blancas concession, following the completion of the wells earlier that year (La Mañana, Neuquén, 25/05/2013). According to the Under-Secretariat for Mining and Hydrocarbons in the province, Shell had by that time drilled and fractured four others wells; three in Águila Mora and one in Cruz de Lorena. Based on these promising results, Shell decided to increase its investments, and soon announced a tripling of its shale gas investment in the area, rising to US$ 500 million by 2014 (Bloomberg News, 10/12/2013). This made Shell into a central player in the Vaca Muerta basin.

The longer-term investment strategy of Shell however remains unknown. Whilst Shell issued a press release in 2012 about its investments into "exploration and further exploitation of unconventional reservoirs of oil and gas in the Neuquén Basin" (Shell, 08/06/2012), Shell Argentina's website provides no information about their activities in Vaca Muerta.

It is also worth noting that the official holder of Shell's concessions is the provincial company GyP, whose full operations and accounts are unknown. Shell has signed contracts with other operators without providing public information and without a public tender process, so the conditions or limits imposed by it (or other operators) in the contracts remain undisclosed.

Shell well in Aguila Mora.
© Ike Teuling

MAP OF CONCESSIONS OWNED BY SHELL IN THE NEUQUÉN PROVINCE



AUCA MAHUIDA, DRILLING IN A PROTECTED AREA

Auca Mahuida was declared a natural protected area in 1996 (Provincial Decree No. 1446), but this only became legally binding in 2008 when the Law on Natural Protected Areas (No. 2594) was ratified and officially recognized the existence of 11 protected areas in the Neuquén province. However, conservation policies are not a priority for the Neuquén government, as demonstrated by the lax implementation of the law and its appetite for new extractive activities in these protected areas.

The importance of conservation

The Auca Mahuida Natural Protected Area is **one of the most precious biodiversity centres of the Patagonian Steppe, with an exceptionally diverse mammal population**. The area is extremely rich and hosts a number of species that have disappeared or are very rare in other parts of the province. It has one of the largest populations of guanaco, cougars, red and grey foxes, Geoffroy's cats and Pampas cats, Patagonian weasels and ferrets, skunks, maras, pichis, hairy armadillos and chinchilla rats. Little is known about the reptile fauna, with potentially numerous but yet undiscovered endemic species of lizards. Dozens of species of birds have been registered, including the rhea, whose population has declined by more than 80% in some places in Neuquén. The area also hosts recently discovered condors. This is why Auca Mahuida has been declared an ***"Important Bird Area"*** **(IBA)**, by BirdLife International and Aves Argentinas.

The Auca Mahuida area also hosts important flora diversity, with species ranging from the mountain shrub steppe, Patagonia grasslands in the Payunia district and traditional Andean highlands flowers. Fourteen endemic plant species have also been found in the Payunia area.

Additionally, the **Mount Auca Mahuida is a mythological-ritual-ceremonial site for Mapuches** and native people. There are several archaeological sites, in which petroglyphs and rock paintings can be found. From a paleontological point of view, the area also has a **high potential for dinosaur fossils**.

Flora of Auca Mahuida.
© Sergio Goitía

Hydrocarbon extraction in a legal vacuum

The protected regions of Neuquén province are facing several challenges, including the **problematic lack of a regulatory framework to adequately protect them**. This serious legislative shortcoming hinders the work of the t Department of Natural Protected Areas (DNPA), the authority that should control and regulate the mining activities in the area.

Firstly, the Law on Natural Protected Areas cannot be applied as it still lacks a regulatory decree, which should have been made within 180 days of the law's enactment, almost 6 years ago. The decree proposal, which was submitted on time by the DNPA technical teamwas never addressed. Secondly, the General Management Plan of Auca Mahuida, which was finalized in 2000, has never been approved by the provincial executive, thereby generating a 'legal vacuum'. The Plan sets out an extension of the protected area from 77,000 to 120,000 hectares, and establishes the zoning of activities within the reserve. This is important because if the Plan had been approved, nearby wells recently drilled by ExxonMobil, Shell and Total would be entirely inside the Auca Mahuida area. This 'legal vacuum' also increases the lack of accessible information for DNPA technicians, who are unable to access the Environmental Reports of companies operating in these immediately surrounding areas.

This lack of accessibility is further compounded by the significant underfunding of staff. The technical teams argue that they do not have the necessary resources to undertake their work, including for example no working vehicle. There are only two inadequately trained park rangers for the entire area, one of which has a precarious contract. Nonetheless, in an interview, one of the park rangers noted the warnings he had sent to his managers about the environmental impacts generated by Total's new unconventional wells, particularly regarding its location on the condor nesting area. This was never taken into consideration. Despite these significant limitations, the DNPA staff provide knowledge of the environmental situation in the area, unlike most other zones.

A 2012 DNPA report recorded 11 hydrocarbon concessions directly affecting the region of Auca Mahuida. Based on their limited data, there are over 69 wells and associated infrastructure and roads that cover over a thousand kilometres, all affecting the protected flora and fauna. These activities involve YPF, Shell, Total, ExxonMobil, Wintershall, Pan American Energy (Flanges, BP, CNOOC), GyP, Medanito (working with national and World Bank capital) and EOG Resources, as operators and/ or owners. During the field visits made in preparation of that DNPA report, environmental violations were observed at almost all wells, and the companies were then required to take concrete steps to clean up the damage. More than two years after that report, the situation has not changed.

Fauna of Auca Mahuida - Oncifelis geoffroyi.
© Sergio Goitía

It is important to note that despite previous and current environmental damage caused by the industry, its expansion continues. Environmental technicians (interviewed by the authors) indicated the problematic treatment of Environmental Reports, which are conducted by agencies but paid for by UFF companies. They argue that authorities do not take into account their opinions regarding malpractice by the consulting firms which use and indiscriminately copy generic information from other works without undertaking full field research. Technicians also report that the Secretariat of Environment and Sustainable Development, the government bureau with policing power in these matters, is systematically approving licenses for unconventional hydrocarbon extraction "conditionally" due to the degree of errors and absent information. Juan Fittipaldi, a lawyer specialized in environmental law and involved in several cases against Total, reports that **this practice is contrary to the stipulations of the existing legal framework** (Article 12 of the General Law of the Environment No. 25,675) which requires Environmental Reports to be approved or rejected in their entirety (Río Negro, 05.01.2013).

In summary, **the enforcement authority makes no attempt to comply with the Law on Natural Protected Areas**, aimed at the conservation of biodiversity. The incomplete policies create a 'legal vacuum' as well as maintaining the underfunding of staff, which reflects the difficulty of safeguarding a protected area in a UFF boom. Although the exploitation of fossil fuels was occurring prior to the creation of these protected zones, since their establishment there has been little progress towards its withdrawal. Instead, the continued territorial expansion of UFF activities is still being supported. Efforts to carry out an appropriate and effective conservation policy would no doubt come up against an array of powerful vested interests, primarily from the oil and gas industry.

Well head on a Shell drilling site in Sierras Blancas.
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DRILLING FOR SHALE GAS IN THE LAND OF WINE, FRUIT AND CATTLE

One of the richest spots in the Vaca Muerta field is the Loma Campana concession, owned by YPF-Chevron, close to the city of San Patricio del Chañar. Shell is active in two concessions close to Loma Campana: The Cruz de Lorena and Sierras Blancas concessions, the latter of which has already seen four wells fractured by Shell. The construction and operations of these wells could have serious impact on the agricultural activities of the San Patricio del Chañar region, an agricultural area where the oil industry had previously been absent.

The history of the city of San Patricio del Chañar is, since the late 1960s, one of agricultural activity fed by water from the Neuquén River. Although early developments were mostly focused on potato plantations, vineyards and orchards now dominate. The city, along with the neighbouring town of Añelo, is part of the 'Patagonian wine corridor'.

These agricultural activities however are now threatened by UFF development. Shell has been promoting this as an 'economic transition', funding training courses for work in the oil and gas industry, as part of its Corporate Social Responsibility program. Within this framework, and in agreement with the Municipality, Shell has organized workshops which attempt to win over local residents (La Mañana Neuquén, 17/12/2013). Shell also fails to pay heed to the impact that its activities have on other local sectors. One stark example of this is the plight of the Criollo farmers, families that have traditionally used the Patagonian steppe for small-scale livestock farming. Interviews with the community revealed that **Shell neither carried out a consultation process with local farmers, nor took into consideration the impacts of its drilling activities on their fields**. One farmer, Ceferino Flores, whose home is a few hundred meters from the wells, listed some of the everyday problems experienced since Shell's arrival: *"They opened several roads here, the field has become unmanageable. We do not know who enters and who exits. We had 5000 animals when my dad was alive [some years ago], we have only 260 today."* In order for a drilling site to be constructed, land must be cleared for roads extensions and the installation of infrastructure such as pipelines, tailing ponds and compressor stations, etc. These activities increase truck traffic and produce airborne dust, lead to water shortages in nearby woodland and reduce the available pasture for cattle. In the case of the Flores family, a large pool was also built on their territory to store fresh water supplied by aqueducts running from San Patricio del Chañar causing deforestation and erosion. Even though the family is not connected to the water grid, they are forbidden from using the water Shell is storing on their territory.

Although Shell notes the location of small farmers in its Environmental Impact Assessment reports, it has **not established any kind of relationship with them up to now. Nor were the farmers compensated for the direct environmental degradation of their land as a result of Shell's drilling activities**. Despite the fact that some of the small farmers showed a willingness to negotiate an agreement with Shell, the Flores family highlighted both the lack of dialogue with the company and the few benefits obtained. Shell could have, for instance, supplied them with access to basic services like water and electricity, services which the company had already developed at drilling sites close to the farmers' homes. According to the Flores family, as well as impacts from the deforestation of woodlands, they also suffer the effects of operational failures such as leakage from tailing ponds, spillages of unknown liquids from trucks and visible oil spills at the drilling sites.

Any discussions that did take place between Shell and the local farmers were carried out in the absence of state representatives. Villagers claim that no government officials have come to their territory. Dossiers on the construction and operation of Shell's first wells confirm this, showing only a single tour of inspectors from the Sub-Secretariat of Environment in the entire area.

San Patricio del Chañar's development as a wine and fruit cultivation region was part of a strategy for the productive diversification of the province. The expansion of the oil and gas industry now endangers food sovereignty and traditional livelihoods. Although Shell has organized training programs for local residents, the limited capacity of the UFF sector to absorb the labour force means that full and sustainable employment of the residents of San Patricio del Chañar in the oil and gas industry is unlikely.

Dead bird in a container at a Shell well in Sierras Blancas.
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LAX AND INCORRECT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORTS

Shell has had to prepare a total of seven Environmental Impact Assessment (EIA) reports for its various projects in Argentina. These reports reveal how laxly Shell approaches the legal and regulatory framework it is supposed to conform to, as illustrated by the EIAs for its first two wells in the Sierras Blancas concession (January 2012 File N^{0} 5390-000085-12 and 5390-000752-12, Well O&G.Nq.SB.x-1001h and O&G.Nq.SB.x-1002h - – Sierras Blancas Basin) and its first two well in Águila Mora concession (Informe Ambiental Perforación de un Pozo Exploratorio de Petróleo y/o Gas O&G.Nq.AM.x-1(h) and O&G.Nq.AM.x-2(h), Yacimiento Águila Mora Provincia de Neuquén O&G Developments S.A. Octubre, 2012)..

Shell EIA for the Sierras Blancas concession

Illegal division of drilling and fracturing stages

Shell's Sierras Blancas EIAs separate its planned activities into two stages: the drilling phase and the fracturing phase, with the impact of each dealt with separately. Thus, the reports fail to provide a comprehensive evaluation of the projects, as they do not take the cumulative impacts of the different operations into account. By separating the phases in the EIA, Shell is able to address the hydraulic fracking activities as a modification to the original plan, which in effect results in inconsistencies and contradictory information.

As reported by Juan Fittipaldi, this practice in fact violates the existing legal framework (Article 12 of the General Law of the Environment No. 25.675) which requires the reports to be approved or rejected in their entirety (Río Negro, 05/01/2013).

Lax and incomplete reporting

Shell's first EIA was criticised by the Sub-Secretariat for the Environment and the Provincial Directorate of Water Resources for missing basic documentation and several other shortcomings:

- inaccuracies regarding the distribution and location of facilities;
- lack of information about the origin of aggregates and water;
- absence of information about the waste management methodology;
- absence of data on water disposal wells;
- lack of municipal authorisations;
- lack of information about the volume of, and method to dispose, flowback water; and,
- unclear or missing safety data sheets for chemicals.

Shell, in its answer to the Sub-Secretariat, declined to provide further details on many of the points raised. Yet the enforcement authority then agreed to the license without any further objections. Shell's second EIA, submitted several months later, also failed to comply with the legal requirements. Alongside the above omissions, Shell also frequently reported activities to the regulatory bodies only after they were undertaken, which is against current legislation. Nonetheless, the Sub-Secretariat for the Environment approved Shell's belatedly updated plans, stating only that *"for future submissions it is requested that amendments be attached before performing the tasks"* (Ministry of Energy, Environment and Public Services, 2012: 34).

Another illustration of the lack of proper enforcement is the fact that the dimensions of the pool for water storage, as described in Shell's August 2012 EIA, differs significantly from the dimensions recorded by the Sub-Secretariat for the Environment in October of the same year. This discrepancy was not noticed by the enforcement authority and no action was taken.

Confusion over water usage during hydraulic fracturing stage

Shell's EIA for its first well in Sierras Blancas is astonishingly blasé regarding attention to detail about its hydraulic fracturing activities in the Vaca Muerta formation. For example, the report describes the technique on page 22 as *"typically using about 3000m3 of water per frack"*, then two pages later, on page 24, stating that *"the amount of water used is approximately 4000m3"* per frack. A one-million-litre difference in two pages!

Undisclosed list of chemicals

As a requirement for its approval, the Department of Environmental Assessment of Hydrocarbon Activity told Shell to include safety sheets for the chemicals used at the fracking stage, in its first EIA (30/03/2012). In response to this demand, the company argued that *"the products to be used depend on the type of water used for the fracturing. This water quality is not yet defined and details will be presented as an addendum to this record prior to the beginning of stage of fracturing"* (O & G Developments, 07/06/2012). In addition, Shell stated that *"the technical specifications of the equipment, and tools to be used, will depend on the drilling contractor eventually selected"* (page 20), thus entirely failing to report on these key factors of its operations.

Conflicting reports on flowback treatment

A similar picture of Shell's obfuscation and ambiguity can be seen regarding flowback water. The Water Resources Authority criticised Shell's reports, noting that *"the location of the flowback disposal well is not clear; there is no proper authorization and no correspondence with the facts stated in previous meetings, in which it was indicated that the effluents will be directed to evaporation ponds."*

Shell' responded to this by stating that *"in the first stage, the flowback water will not be disposed of in a flowback disposal well. It will be removed from the site, transported, treated and disposed of by authorized companies. The companies contracted for this service are Idarsa, Comarsa and Transecológica. The estimated volume of flowback water is between 15% and 40% of the water used in the hydraulic fracturing stage. More specific details of this stage, as with the stages of testing and production, will be presented as an addendum to this file before the beginning of these stages"* (O & G Developments 07/06/2012). Here, again Shell avoids providing details, including the amounts and types of chemicals used.

In an addendum to its second EIA, Shell includes a 'Waste Management Plan', developed by Schlumberger, which provides contrary details about the hydraulic fracturing and flowback. The first part of the Waste Management Plan covers the Sierras Blancas and Águila Mora concessions, but the second part, on Flowback Water Treatment, suddenly switches to describing the Cruz de Lorena concession. This later part specifies 6.5 million litres of fresh water per well with a return of flowback water of 30%, nearly two million litres. This is a direct contradiction of an earlier reported figure for water use of 3 to 4 million litres.

Shell also reports that, based on the results from its first wells, the aim will be to reuse the flowback water in new wells, after on-site filtration. The water that cannot be recovered for reuse will be temporarily stored in "open auxiliary tanks", and later injected into flowback disposal wells. However, the actual disposal procedures it lists seem to be contradictory, including the provison that *"if the company decides not to reuse the fracturing return water, Peduzzi Transport can transport it to Comarsa for treatment and disposal"* (page 30). Shell also reports that sand will be separated from the flowback water and treated in the same way as the drilling sludge, temporarily storage in open containers and then transported by truck to Comarsa. Finally, it notes that a biocide will be used in the pool installed in Sierras Blancas to prevent biological growth, but no detail about the type or amount is provided.

Shell EIA for the Águila Mora concessions

In the EIA for its first horizontal well in Águila Mora, Shell resorts to the same tactics of omissions, partial information and short-term plans. Submitted in October 2012, the Águila Mora EIA contained so many technical mistakes that the supervisory authority's auditors told Shell to undertake another report. To do this, the company hired a new consultant, who presented his work in March 2013. As with the EIA for Sierras Blancas, this report separated the drilling stage from the hydraulic fracturing stage, stating that *"implementation of the project involves only the stages of construction, drilling and completion of the well, foreseeing the evaluation of the remaining steps at a later date"* (2013: 12).

Although the EIA does not cover the fracking stage, it does note that, in order to reduce the consumption of surface water and enable 40% of the injected water to be reused, responsibility for treating the flowback water will be transferred to Swaco Argentina SA (Schlumberger). As in the Sierras Blancas concession however, this water management plan conflicts with previous statements, meaning the overall plan of the company is once again unclear.

In sum, analysis of four of Shell's seven EIAs shows the company's complete lack of seriousness, including reporting different and inconsistent volumes of water to be used in the fracturing stage, referring to multiple conflicting methods to manage flowback water, refusing to give details about the quantity or composition of chemicals to be injected, and keeping information on the type and amount of gas flared secret.

RECOMMENDATIONS

1

RECOMMENDATIONS TO FRENCH, DUTCH, EUROPEAN AND ARGENTINIAN PUBLIC AUTHORITIES

Concerning the activities of European multinationals:

- Adopt binding legislation that imposes legal responsibilities on companies, including the activities of their foreign subsidiaries. This legislative framework should, at least, conform with international recommendations, such as those mentioned in the 'Protect, Respect and Remedy' framework adopted by the United Nations Human Rights Council in June 2010,[1] and with the OECD Principles of Corporate Governance revised in 2011.[2]
- Put in place requirements for financial and extra-financial reporting, on a country-by-country basis, so that multinationals stop taking advantage of the regulatory, tax and legal havens that facilitate their appropriation of natural resources.
- Guarantee that public funding will not be used to violate human rights, workers' rights or the environment, and make independent human rights and environmental impact assessments compulsory prior to the funding of projects, as well as ensuring a follow-up process, that includes sanctions, after projects have started.

Concerning the extractive industries:

- Guarantee full access to all available information on oil and gas projects. Introduce mechanisms to enable locally adapted legal action, where necessary.
- Respect community rights and the central role of communities in decision-making regarding the natural resources of their territories. Obtain full, prior and informed consent before granting any oil and/or gas license.
- Ban oil and gas projects in protected natural areas, World Heritage Sites and areas of specific cultural or religious value, at the very least.
- Take the various kinds of impacts from unconventional oil and gas into specific consideration in national and European legislation, and recognise the high carbon-intensity of the extraction process of these unconventional fuels.
- Adopt and implement binding policies at a European level that lead to a phase-out of fossil fuels, and encourage ambitious energy efficiency policies.
- Impose a moratorium on the funding of all mining and energy extraction projects by the European Investment Bank, to be extended until the Bank has fully adopted all the recommendations of the Review of Extractive Industries.[3] Also ensure that appropriate mechanisms are put in place to guarantee their implementation.

2

RECOMMENDATIONS TO EXTRACTIVE COMPANIES AND PRIVATE BANKS

- Suspend and stop investments in the most controversial fossil fuel projects, particularly those where unconventional oil and gas are being exploited, and where people's health and their means of subsistence are affected.
- Make ambitious commitments to invest in clean renewable energy, and implement these projects.
- Develop a long term strategy towards the complete phase-out of investment in, and extraction of, fossil fuels.

1 http://www.ohchr.org/FR/NewsEvents/Pages/DisplayNews.aspx?NewsID=11164&LangID=E
2 http://www.oecd.org/corporate/ca/corporategovernanceprinciples/31557724.pdf
3 http://www.eib.europa.eu/attachments/thematic/extractive_industries_en.pdf

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