



Vaca Muerta Basin: An Oil & Gas Trap

IMF and global capital markets neglect the risk of ballooning Argentina's debt and liability problem

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About this report

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Summary

Starting this year, Argentina is engaged in the 22nd round of debt restructuring in its history, a large USD 57 billion program. A high debt service towards international financiers, a high inflation, a low confidence in economic reforms in the Argentine political environment and a weakly diversified export base are reasons for a lack of international financing of Argentina and Argentine corporations. This situation also affects financing of oil & gas expansion. Meanwhile, the country sits on one of the largest shale oil & gas areas in the world which could provide a replacement for Russian oil & gas.

The large unconventional (shale) oil & gas field Vaca Muerta and is seen by various stakeholders as a potential 'game changer' for the Argentine economy. Against current international oil & gas prices, the Vaca Muerta field's reserves could be valued at USD 2,055 billion, or four times the Gross Domestic Product (GDP) of Argentina and five times its public debt.

Meanwhile, the international debate on climate change is increasing. Consequently, the number of zero-emission commitments by companies, investors and banks is rising. The importance of a reduction of carbon emission is also widely accepted by governments. Despite of this, oil & gas companies, consultancies, international commercial banks, investors, the International Monetary Fund (IMF), the Group of Twenty (G20), the Argentine government and some European Union (EU) member states still create a narrative of expansion of oil & gas capacity in Argentina and the Vaca Muerta. Regional development banks continue to give financial support.

In this narrative, many stakeholders refer to the need for Argentina's access to international financial markets to accelerate the exploitation of the Vaca Muerta basin, expand the number of pipelines and create a liquified natural gas export hub. The Russian invasion of Ukraine and the EU plan to reduce Russian oil & gas imports contribute to strengthening the narrative on the Vaca Muerta production expansion.

All stakeholders, including the IMF, are focusing increasingly on Environmental, Social and Governance (ESG) issues. However, in relation to Argentina the IMF is focusing on equality and gender issues (the S) but lacks implementation of its policy intentions on E (climate change mitigation). Energy subsidies remain intact in their playbook for Argentina in order to attract international financing. IMF only proposes to adjust energy subsidies to raise their effectivity. Bottom-line, all actions promoted by the IMF remain focused on access to international capital markets and adaptation to the global economic order. These are essential to facilitate repatriation of returns on investments from Argentina to international financiers.

In all the individual narratives which are gradually creating an environment for exploiting the Vaca Muerta basin, the societal costs have been neglected. Production growth in the Argentine Vaca Muerta would lead to a strong increase in Argentina's Scope 1, 2 and 3 carbon emissions. The current emissions of the Vaca Muerta field account for 14% of Argentine Nationally Determined Contribution (NDC) target of 2030. In case the field is harvested in a period of 50 years, the annual emissions from the basin would be 50% of the Argentine NDC target in 2030. If the carbon emissions of the Vaca Muerta reserves would be charged against the current carbon price in various jurisdictions, the total liability of Argentina would be valued at USD 943 billion for the whole basin.

Another large element in societal costs is formed by health care costs due to air pollution, which are passed on by oil & gas companies and financial stakeholders. Similarly, costs related to oil & gas spills are passed on by companies to society. The full Vaca Muerta basin could account for a range of USD 2,047-4,575 billion of such costs.

Stranded asset risk will probably add to these costs. As many countries make the transition from a fossil fuel-based economy to a renewable (energy)-based economy, the current international attention for Argentina's oil & gas reserves will probably be temporary. When the increased global

capacity of renewable energy will lead to much lower oil & gas demand and lower oil & gas prices, financial losses will occur for high-cost oil & gas fields, like shale fields. These become unprofitable at an oil price equivalent of USD 50 per barrel. Subsequently, a price decline will lead to stranded assets. With USD 120-150 billion to be invested in the Vaca Muerta until 2030, stranded assets could amount to USD 96-120 billion. Moreover, the current account of Argentina might deteriorate, leading to a next debt crisis.

The sum of the carbon liability, the unpaid health care and oil spill cost, and the stranded assets could range from USD 2,226-5,637 billion, versus potential proceeds of USD 2,055 billion at current market prices. A halving of the prices (to USD 50/barrel) triggered by renewable expansion would lead to a break-even situation in financial terms, but the societal loss in a high scenario would be USD 5,637 billion. This liability is 13 times the current public debt of Argentina. An oil price equivalent of USD 25 per barrel, would lead to USD 6,151 billion loss, as an additional USD 513.8 billion operational loss would be incurred.

Table 1 Vaca Muerta exploitation scenarios and neglected costs

USD billion	Scenario A	Scenario B	Scenario C
Oil price equivalent/barrel (USD)	100	50	25
Potential revenues of basin over lifetime	2,055.0	1,027.5	513.8
Operational costs	1,027.5	1,027.5	1,027.5
Operational result (A) – lifetime of the basin	1,027.5	0.0	-513.8
Neglected costs			
Unpaid carbon costs	83.1	942.5	942.5
Unpaid air pollution and health costs	2,044.5	4,572.3	4,572.3
Unpaid oil/gas spill pollution	2.5	2.5	2.5
Stranded assets	96.0	120.0	120
Total external costs = stranded assets (B)	2,226.1	5,637.3	5,637.3
Total result (A -/- B)	-1,198.6	-5,637.3	-6,151.0
% versus public debt 2022F	285%	-1343%	-1465%

Source: Profundo. Scenario A shows a potential best outcome with a high oil price and low societal costs; Scenario B is a potential worst outcome with a lower oil price and high societal costs.

Abbreviations

B/d	Barrels per day
Cf/d	Cubic feet per day
DCF	Discounted Cash Flow
EACs	Exceptional Access Criteria
EIA	Energy Information Administration
EPE	Ex-Post Evaluation
ESG	Environmental, Social, Governance
GDP	Gross Domestic Product
Gigaton	Billion tons
IMF	International Monetary Fund
LNG	Liquified Natural Gas
Mcm/day	Million cubic meter per day (gas)
NDC	Nationally Determined Contribution
Operating profit	Revenue minus costs to operate an oil & gas field
SBA	Stand-by-Agreement
USD	United States Dollar

Introduction

The global economic model seems to be driven by the ideology of the leading large economies which have economic weight and resources to keep the current narrative intact. The question in this report is how Argentina is embedded in this narrative, and how far its international financial position is dependent on developing its export base, and therefore growing the Vaca Muerta shale oil & gas production.

The research in the current report consists of two parts. First, a calculation of the relative importance of Vaca Muerta for the Argentine economy is presented. In addition to this economic value, the societal costs are calculated: which costs are not paid for by the oil & gas industry and its private financiers. These societal costs include environmental costs (carbon emissions and pollution by spills) and health care costs. These costs are often neglected in the discussion. The risk of stranded assets and their value is also discussed.

Secondly, the various important (international) stakeholders have created a narrative about the importance of Vaca Muerta for Argentina's future and the country's economic position in the global economy. The significance of these need to be investigated. The question is whether this narrative is justified in the context of revenues and total costs of the Vaca Muerta exploitation.

1

The economic importance of Vaca Muerta

In this chapter the economic importance of Vaca Muerta is analysed. What is the value of the field, and how could it support Argentina's solvency and liquidity? With rising global oil & gas prices following the Russian war in Ukraine, and the European Union's search for alternatives to Russian oil & gas, the proceeds of the field could be higher than earlier expected.

1.1 The size of the field – potentially much larger

Vaca Muerta is one of the largest shale resources in the world, located in the Neuquén Basin in the Northern Patagonia region of Argentina. Covering an area the size of Belgium, it is the world's fourth-largest shale oil reserve and the second largest for shale gas.¹ The shale formation has technically recoverable resources of 308 trillion cubic feet (Tcf) of natural gas and 16 billion barrels of oil and condensate. The Energy Information Administration (EIA) considers the Vaca Muerta non-conventional gas resources to be comparable to Eagle Ford in Texas.²

It should be noted that these are estimates and estimates might go up. Potentially, with better techniques, the reserves can be larger than the EIA indicates: "*The Vaca Muerta Formation has risked, technically recoverable shale gas and shale oil resources of 308 Tcf of gas and 16 billion barrels of oil and condensate, from 1,202 Tcf and 270 billion barrels of risked, in-place shale gas and shale oil resources.*"³ Better techniques are developed quicker when oil & gas prices are high, like they are at the time of writing.

According to the previous Argentine administration's National Energy Plan, published in 2019, export revenues from Vaca Muerta alone could most likely outweigh agricultural exports, with a total of USD 34 billion by 2027. To achieve this, extraction would have to double in the period 2020-2024 in order to reach 260 million cubic meters of gas per day (mcm/day) to export 100 mcm/day of gas, and 1 million barrels of oil/day to export 500,000 barrels/day of oil. This means that 50% of oil extraction and 38% of gas extraction are intended to be exported to the international market.⁴ In a recent visit to Spain (May 2022) by Argentina's president, a total number of USD 15 billion export proceeds on LNG was mentioned for 2027.⁵

Energy self-sufficiency is important for Argentina, but also export proceeds are essential for the economy. Lower imports and higher exports will help to repay the external debt and to pay interest on this debt, which represented 90.2% of the country's GDP in 2019. In fact, in the face of the impacts of the 2018 drought on the agricultural sector - and, thus, on national exports - the IMF showed particular interest in Vaca Muerta and highlighted its potential to improve the trade balance.⁶

1.2 The status of production and exports

The production from Vaca Muerta feeds into domestic energy consumption, as well as exports. According to data from the Energy Secretariat, the formation now accounts for 38% of Argentina's total oil output of 578,000 b/d and 32% of the 4.5 billion cf/d in gas.⁷

In July and August 2020, oil production for the first time was higher than 160,000 b/d (respectively 162,000 and 161,000), while it reached 120,000 b/d in December 2020. In 2021, oil and gas

production in the Vaca Muerta grew substantially. Energy Research company Rystad expected (in 2021) 200,000 b/d end of 2021. Gas production also grew strongly, with August 2021 showing a record of 1.6 billion cf/d versus 890-920 million cf/d in the period November 2020-April 2021. This increase was the result of a strong expansion by Argentine operators YPF, Shell, Pan American, TecPetrol and PlusPetrol.⁸

In 2021, the leading company active in Vaca Muerta was YPF, followed by Pan American Energy and Shell (Table 2). Fracking stages^a reached a total of 10,254 in 2021, compared to 3,276 stages in 2020 and 6,405 in 2019.⁹

Table 2 Leading operators in Vaca Muerta, by fracking stages (2021)

Company	Country	Fracking stages
YPF	Argentina	5,084
Pan American Energy	Argentina	1,176
Shell	United Kingdom	1,142
Vista Oil & Gas	Mexico	914
Tecpetrol	Argentina	890
Pluspetrol	Argentina	360
ExxonMobil	United States	297
Total Austral (TotalEnergies)	France	234
Phoenix	Philippines	46
Other		111
Total		10,254

Source: *Bnamericas* (2022, January 5), "Snapshot: Vaca Muerta's most active frackers in 2021".

First export cargoes of LNG were reported in 2019. Oil exports from the area started in 2020, with destinations including Brazil, the United States, Chile and the Bahamas.¹⁰ As reported in December 2021, state-owned YPF, the biggest oil and natural gas producer in Argentina, is conducting studies to prepare for building LNG export capacity in the light of growing gas production from the project and increasing global demand. Argentina could benefit from its counter-seasons, as domestic demand is low when demand in the Northern hemisphere is highest. However, when such a multibillion-dollar project can start remained unclear considering the country's financial crisis and difficulties to access capital at affordable rates.¹¹

In June 2022, the country published a tender for a USD 3.4 billion pipeline to bring gas to demand centres in the country which should be in service in 2023. In the meantime, Argentina faces a growing gas deficit in the upcoming Southern Cone winter, meaning that it will need to import LNG and additional volumes.¹²

In 2021, the country imported natural gas in gaseous state at a value of USD 965 million from Bolivia, while exports to Chile reached a value of USD 100 million in the same year. Imports from Bolivia have been continuously high in recent years, at values between USD 1.4 billion in 2018 and USD 1.0 billion in 2020. LNG imports had a value of USD 1.2 billion, with the United States accounting for two-thirds and Qatar for the remaining third. Imports showed considerable variations in recent years, with a value of USD 225 million in 2020 and USD 431 million in 2019,

^a The multi-stage hydraulic fracking commonly takes on average 10 to 15 stages to maximize the recovery of the contained oil or gas. The number of stages depends on the lateral length of the well.

down from USD 1.0 million in 2018. Meanwhile, total oil exports from Argentina reached a value of USD 2.4 billion in 2021, after USD 1.0 billion in 2020 and USD 1.5 billion in 2019.¹³

1.3 The size of the field versus the Argentine economy

The key data on the Argentine economy indicate that while gross debt as percentage of GDP (80.6% in 2021) is at a similar level as seen in some EU member states, its annual debt service (debt repayment plus interest costs) is high versus exports and the inflation rate is also high (Table 3). In general, a high debt service is due to high interest rates (due to high risk) and short maturities.

Table 3 Key data economy Argentina (USD billion)

	2019	2020	2021	2022F
GDP	451.8	389.1	488.6	564.3
Public gross debt	400.7	400.0	393.8	419.8
Inflation rate (%)	53.5%	42.0%	48.4%	51.7%
Current account	-3.7	3.3	6.3	2.04
Trade balance	14.4	11.8		
Exports	80.0	64.6		
Imports	65.6	52.8		
Public gross debt as % of GDP	88.7%	102.8%	80.6%	74.4%
Debt service as % of exports	50.9%	41.1%		

Source: IMF Argentina (2022), "Country data: Argentina"; The World Bank (2022), "Data – Argentina".

With oil and gas prices rising due to the geopolitical tensions, the value of the Vaca Muerta field has become higher recently. The necessity of new fields to diversify away from Russian oil & gas might support the Vaca Muerta development. Table 4 shows various estimates for size and prices. For the 'current value' calculation a USD 100/barrel is applied for oil and the USA gas price, as current European prices are stretched due to scarcity. For gas, the lower volume estimates are used from GeoExpro. The total current value of the reserves can be estimated at USD 2,055 trillion and probably more. As fracking is a relatively expensive way of exploitation with break-even costs around USD 50 per barrel,¹⁴ an oil price above USD 100 per barrel will support the narrative to develop the Vaca Muerta.

Table 4 Vaca Muerta data and potential proceed

	Oil (billion barrels)	Gas (Tcf)	Total
Size (GeoExpro)	14.2	91.0	
Size (EIA)	16.0	308.0	
Size (in billion barrels equivalent)			18.6
Price per cubic feet (USD) USA	100	0.005	
Price per cubic feet (USD) Europe	100	0.048	
Revenue potential (USD billion)	1,600.0	455.0	2,055.0
Capex needed up to 2030 (USD billion)			120-150

Source: Profundo, Macellari, C. and J. Whaley (2019), "The Vaca Muerta Formation: How a Source Became a Reservoir", *GeoExpro*, Vol. 16(4); U.S. Energy Information Administration (EIA) (2019, July 12), "Growth in Argentina's Vaca Muerta shale and tight gas production leads to LNG exports".

Vaca Muerta's potential size is relatively large versus Argentina's economy and key economic indicators. Versus current oil & gas prices, the value is:

- 4.2 times GDP (2021 expected)
- 4.9 times public debt (2022F).
- 31.8 times annual export value (2020).

The large size of Vaca Muerta versus the public debt could give the international financial markets a significant boost of confidence in the solvency of Argentina.

Vaca Muerta is important in relation to repaying public debt. Exports will boost the repayment capacity of external debt, which was near 100% of Argentina's GDP in 2020 (Table 3); around 75% of the external debt is denominated in foreign currency. Argentina's main external creditors were private lenders and multilateral and bilateral finance institutions, which hold 63% of the total debt. International financial institutions (IFIs) represented 21% of the national debt, including the IMF, which held 14% of the total.¹⁵

Table 5 Vaca Muerta value versus economic data

As % of	2019	2020	2021	2022F*
Annual GDP	455%	528%	421%	364%
Public gross debt	513%	514%	522%	489%
Annual exports	2569%	3181%		

Source: Profundo, based on tables above; F = forecast

The current production in Vaca Muerta is still limited versus the total reserves. In January 2022, the annualized production per day was approximately 0.48% of total reserves (Table 6).

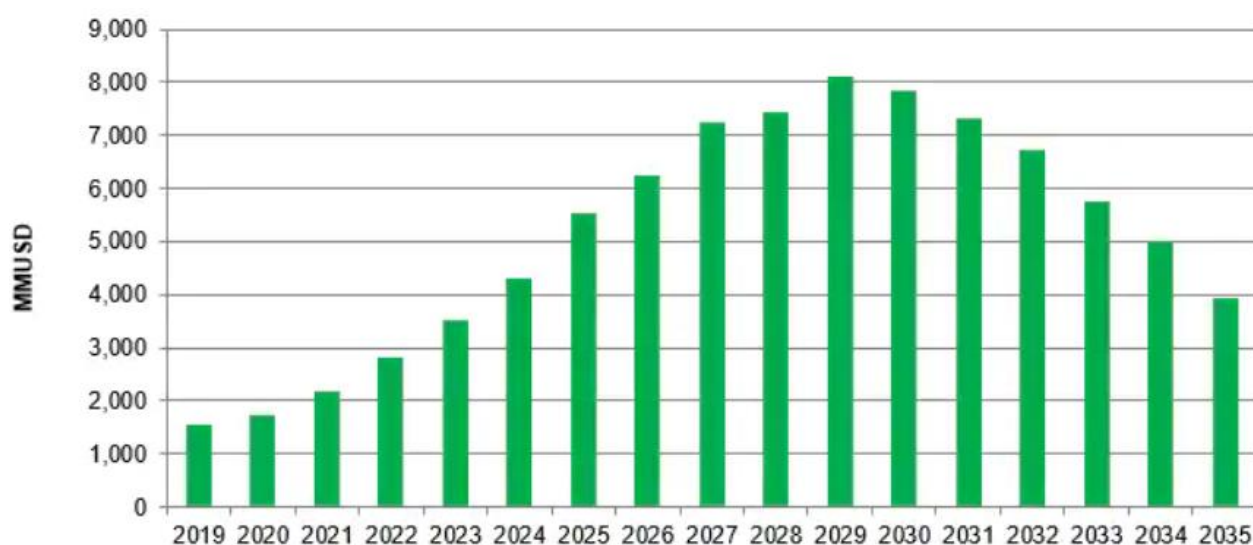
Table 6 Vaca Muerta current annualized production versus reserves

	2018	January 2022
Gas (billion cubic feet/day)	1.0	1.7
Per year (billion cf*)	364	608
As % of reserves	0.12%	0.20%
Oil (million b/d)	NA	0.22
Per year (billion cf)	NA	80.08
As % of reserves	NA	0.56%
Proceeds (USD billion)**		9.9
As % of:		
Annual GDP		2.0%
Public gross debt		
Annual exports		12.4%
Total reserves		0.48%

Source: Profundo; cf = cubic feet; **) based on USD 100/barrel and USA gas price.

It is estimated that Vaca Muerta will require an investment of USD 120 billion up to 2030 (USD 8 billion per year).¹⁶ Other sources mention USD 150 billion until 2030, or between USD 15 and 20 billion annually.¹⁷ Up to now, investments have been much lower due to volatile and low oil prices before 2022 (fracking has a high break-even cost), and economic, foreign currency and funding uncertainty.

Figure 1 Vaca Muerta Capital Investment Forecast (USD million)



Source: IHS Markit/S&P Global (2019, July 19), "The Vaca Muerta Play: Gaining competitive economics through operational efficiencies".

Between 2016 and 2018, the companies that are now extracting oil and gas in Vaca Muerta obtained more than USD 3.7 billion in subsidies. When comparing amounts received with planned pilot investments, subsidies covered more than 50% of investments in some cases. Alternatively, these subsidies could have covered large social expenditures, for example on child and elderly welfare in the country.¹⁸

1.4 Lack of transparency who will benefit from Vaca Muerta

In the first phase of development of the Vaca Muerta, the trade balance of Argentina will have been negatively impacted. This is explained in the following steps, as an example.

- Step 1 - By giving oil & gas companies subsidies, probably in USD (for instance USD 3.7 billion), these oil & gas companies have been able to do investments of twice this size (thus USD 7.4 billion) in Argentina, in first instance. This is based on the phrase that says: “subsidies covered more than 50% of investments in some cases” (see section 1.3). Thus, oil & gas companies invested this USD 7.4 billion in capital equipment and in setting up an organisation. Assuming that 50% of these costs/investments needed to be imported, USD 3.7 billion flows to foreign oil/gas service companies. This would have led to a negative USD 3.7 billion on the trade balance (balance of export and import of goods and services) in first instance.
- Step 2 – These investments and costs are meant to increase oil & gas production from the Vaca Muerta, leading to higher revenues and profits. A part of production will be consumed domestically, and a part will be exported. This will positively impact the trade balance. However, these future revenues and profits will be used to reward foreign shareholders, bondholders and banks, which lead to primary income transfers (earnings on investments) and negatively affects the current account (trade balance plus primary income transfer = current account). Another part will flow into the Argentine government budget in the form of royalties, tax, and in the form of the profits of the state company YPF.

There is lack of transparency to know how the division of royalties etcetera is and how much is kept for the Argentine budget. Moreover, it is uncertain what the reaction of the government is if the relatively expensive exploitation of shale oil & gas fields leads to losses. A major risk occurs in a scenario when global oil/gas prices are lower than the break-even cost of Vaca Muerta (assumption: USD 50 per barrel oil-equivalent): the operational loss, including interest and lease costs, will lead to a cash outflow for Argentina and a deterioration of the current account. The government might raise subsidies to keep the Vaca Muerta business running, and this might further deteriorate the current account as these subsidies will flow partly into the pockets of foreign companies and financiers.

Currently, global oil/gas prices (around USD 100/barrel) are higher than the break-even cost of Vaca Muerta. This means that the financial benefits can be split between the stakeholders, and the trade balance might benefit (oil & gas exports and imports), probably exceeding the payments of dividends and interest to foreign financiers. Then, also the current account (trade balance plus) will be positively affected.

2

The societal costs and risks

The development and growth of the shale oil & gas reserves of the Vaca Muerta not only lead to extra proceeds, but also to extra costs. Of these, the external costs of carbon emissions related to climate change, the costs related to air pollution and health care, and costs due to oil/gas spills are often neglected. Finally, an additional risk is that the global transition from fossil fuels to renewable energy might lead to stranded assets. This section concludes that the potential costs and losses of the Vaca Muerta project could amount to 13 times versus the current public debt of Argentina.

2.1 Carbon emissions will go up, creating a liability

As a result of increasing production from the shale wells in Vaca Muerta, the carbon emissions will increase. Carbon emissions contribute to climate change and in the coming years carbon taxes might hurt oil & gas operations. Even if they are not paid now, companies should not neglect potential costs in their DCF (discounted cash flow) calculation as oil & gas infrastructure investments are made for the long-term. Moreover, assumed carbon costs and carbon liability could also be seen as proxies for necessary costs to adapt an economy to climate change.

2.1.1 Vaca Muerta CO₂-eq emissions and Argentina's NDCs

In the report "*Five Years Lost. How Finance is Blowing the Paris Carbon Budget*", Urgewald and partners calculated that Vaca Muerta would contain 8,944 mboe of oil and 1,492 bcm of gas with a potential CO₂-eq emission of accumulated 8.7 Gigaton. Exploiting Vaca Muerta to its maximum potential would generate an increase in emissions of 205-240 MtCO₂e per year. These would represent 56-66% of the national Argentinian emissions for 2016 and up to 50% of projected emissions in 2030. These GHG emission conflict with Argentina's commitments under the Paris Agreement.

In a sanity check, Profundo calculated the total and annual emissions based on data from Table 4. The outcomes are presented in Table 7 and Table 8.

In case of the current production rate, it would take 150-200 years to exploit the whole of Vaca Muerta. This would lead to emissions of 68 million tons, or 14% of the Nationally Determined Contribution (NDC) by Argentina agreed in the Paris Agreements for 2030. If the field would be exploited in 50 years, the emissions would be 238 million ton, or 49% of 2030 NDC (483 million ton). Note that these calculations (Table 7) assign all emissions to Argentina, including export (the fossil fuels are partly burnt in other countries).

In 2005, Argentina had emissions of 409 million tons. In the base scenario, 2030 would result in 592 million tons. Including conditional measures, 2030 reduction could occur to 369 million tons, or -37%.¹⁹

Interestingly, almost all of Argentina's expansion plans involve shale oil and gas development in the Neuquén Basin in Northern Patagonia, where the Vaca Muerta formation is located. Exploited to their maximum potential, Argentina's shale gas reserves could eat up 11.4% of the world's remaining carbon budget required to keep global temperature rise to below 1.5° Celsius.²⁰

Table 7 Vaca Muerta: annual carbon emission

Type	Production/year, annualized per Jan-22	# of years production	Current emissions (m ton)/year	Emission in a 50-year exploitation scenario
Oil (million barrel)	80.1	199.8	34.4	137.6
Gas (billion cf)	607.9	149.7	33.5	100.3
Total			67.9	237.9
NDC target Argentina 2030 (million ton)*			483	483
As %			14.1%	49.3%

Source: Profundo, based on 16 billion barrels oil and 91 trillion cubic feet. See Table 4; *) United Nations Framework Convention for Climate Change (2021), *Republic of Argentina First Revision of its Nationally Determined Contribution*.

2.1.2 Cost of emissions

Currently, emissions costs for Scope 1, 2 and 3 are not expensed by industries and countries around the world. Scope 1 represents emissions generated in the operations, Scope 2 are emissions generated in energy and services sourced. There are countries where carbon schemes and trading mechanisms for Scope 1 and 2 emissions have been set up. Scope 3, the emissions that are created by the way the product is used, is not booked as a cost item yet, but is responsible for 90% of the total emissions of an upstream oil & gas operation.²¹

However, with an increasing number of court cases against oil & gas companies, it is of increasing interest to calculate the potential Scope 3 emissions as these costs might impact the return on investment in a later phase of the 2022-2050 period, maybe far above the carbon price level of today. If CO2 costs are set at EUR 81.3 (USD 91.5; 19 February 2022²²) per ton, then the total value of 8.7 gigaton emissions from the field is USD 796 billion (Table 8). The higher outcome of USD 943 billion would be the result of the average of the two reserve calculations (10.3 gigaton). The higher estimate (on gas reserves) of EIA was not used.

Table 8 Vaca Muerta: Total carbon emission costs

	Billion barrels	Trillion cubic feet	Giga (=billion) ton emissions	Emission (ton) per barrel/cubic feet
Total reserves				
Oil	16		6.9	0.43
Gas		308	17.0	0.0000551
Gas 2		91	5.0	0.0000551
A-Total reserves (based on EIA)			23.9	
B-Total reserves (based on GEO ExPro)			11.9	
C-Total reserves (report Urgewald/NGOs)			8.7	
D- Average of B and C			10.3	
E- Price per ton CO2 (USD)			91.5	
Total costs (USD billion, average NGO/Geo) – E x B			942.5	
Total cost (USD billion, NGOs) – E x D			796.3	

Source: Profundo.

2.2 The stranded asset risk

The stranded asset risk could add to these costs. As many countries in the world will focus on the transition from a fossil fuel economy to a renewable economy including renewable energy, the increasing international attention for Argentine shale oil & gas can be temporary. This could lead to stranded assets when the increased capacity of renewable energy will lead to much lower oil & gas demand and lower oil & gas prices.

Because of the high costs of exploitation, shale oil & gas companies face the largest risk of a major production decline in an environment of a strong reduction in fossil fuel demand. This is the same problem as faced by deep-water companies. Shale is the sector most at risk. In a net-zero 2050 scenario, shale companies will lose 80% of their production between 2021 and 2030. Investors looking to align with 1.5°C or net zero 2050 may well find that this makes shale investments increasingly hard to defend.²³ As a consequence, a large part of the additional USD 120-150 billion Vaca Muerta investments might be at risk. In case of the 80% loss, USD 96-120 billion might be at risk.

At the same time, a scenario of declining oil & gas prices and stranded assets might lead to a deterioration of the trade and current account balance of Argentina. The seeds of oil & gas hope might be harvested later in the form of the next debt crisis for Argentina.

In Table 1, three scenarios for the operational result during the lifetime of the basin have been calculated. On top of the stranded assets, an oil price equivalent of USD 25 per barrel (below an assumed USD 50/barrel break-even point) would add an operational loss of USD 513.8 billion for all stakeholders in the Vaca Muerta project. Filling this gap through government subsidies would mean an enormous burden for Argentine government.

2.3 Health care and oil/gas spill costs

In addition to the carbon cost calculation, oil and gas production lead to air pollution and the pollution due to oil and gas spills. Air pollution leads to health care costs and economic costs, in the form of work absences and years of life lost. Oil and gas spills lead to the need for cleaning costs, of which a part is externalized or passed on to the society (governments will pay for cleaning).

Transport & Environment released a report on the total costs in relation to the fossil fuel production of the five Big Oil companies in Europe. Costs included the unpaid external costs of their fossil fuel operations. The health costs were calculated by two methodologies, leading to a high/low outcome range. The health costs were an estimated 4.9 times higher than the carbon costs in a high-scenario, and 24.6 times higher in a low-scenario. The spill pollution costs passed on to society were estimated to be relatively small in this European report. However, because of the characteristics of shale oil & gas, like in the Vaca Muerta, the pollution costs related to water resources as well as the biodiversity damage might be much higher.²⁴ Due to lack of data, it not possible to make a calculation for shale oil & gas biodiversity and water damage.

2.4 Total costs and the significant net loss

Table 9 summarizes the carbon costs, stranded asset costs, and health and spill costs. The total neglected and/or societal, external and unpaid, costs could amount to a total of USD 2,226 billion to USD 5,637 billion. This is significantly ahead of the potential revenues of exploiting all reserves (USD 2,055 billion, see Table 4). As operating costs and financing costs should also be deducted from revenues, the net loss on a Vaca Muerta exploitation could be very high from a societal point of view. In case of a long-term oil price equivalent of USD 50/barrel, the societal loss in a high scenario would be USD 5,637 billion. **This is 13 times the current public debt of Argentina.**

Table 9 Vaca Muerta: Summary of external costs and stranded assets

USD billion	Low scenario	High scenario
Five Big Oil Europe 1993-2020*		
A- Unpaid carbon costs	420.4	4,766.3
B- Unpaid air pollution and health costs	10,339.4	23,122.9
C- Unpaid oil/gas spill pollution	12.6	12.6
Ratio B/A (X)	24.6	4.9
Ratio C/A (X)	0.0299	0.0026
Vaca Muerta		
A- Unpaid carbon costs	83.1	942.5
B- Unpaid air pollution and health costs	2,044.5	4,572.3
C- Unpaid oil/gas spill pollution	2.5	2.5
Stranded assets	96.0	120.0
Total	2,226.1	5,637.3

Source: Profundo; *) Pham Van, L. and G. Rijk (2022, 25 April), *European Big Oil – Big Liability in Carbon, Pollution and Health Care Costs*, Amsterdam, Netherlands: Profundo, commissioned by Transport & Environment.

3

The narrative supporting the Vaca Muerta exploitation

This section discusses the narratives of various stakeholders that are interested in reaping the short-term financial benefits of the Vaca Muerta oil & gas field while neglecting the potential USD 5,637 billion loss on the project. Direct support comes from the Argentine government, the IMF and also European Union member countries plan to assist the Vaca Muerta exploitation following the embargo on Russian oil & gas. Indirectly, international banks and investors do not reject to fund Vaca Muerta oil & gas opportunities as they continue to finance the main oil & gas companies globally. These companies have interests in the Vaca Muerta basin.

3.1 The main actors

The following actors can be distinguished and will be investigated:

- Oil & gas companies, domestic and international.
- (Oil & gas) consultancy firms.
- Financers of these companies.
- Customers of oil & gas, like the European Union.
- Argentine government.
- International financial institutions, like the IMF and the World Bank.
- Regional development and financial institutions.
- G20 (Group of Twenty) – this is an intergovernmental forum comprising 19 countries and the European Union (EU). Its focus is to address major issues related to the global economy, like international financial stability, climate change mitigation, and sustainable development.

3.2 Companies' and their narrative - supportive

Oil and gas companies' main business model is the exploration and exploitation of oil & gas reserves, the refining and processing, and the marketing of these products. From many sources it is known that they have a narrative that oil & gas is needed to provide energy to the world. Their lobby activities can be very intensive, and already exist for many years. Costs of these go into billions of US Dollars. For instance, in the period 1993-2020, the top-5 European Big Oil companies spent EUR 3.7 billion on lobbying and EUR 3.3 billion on marketing activities related to the benefits of fossil fuels and playing down climate change. This occurred in a period after the Rio Summit of 1992, when all stakeholders including oil & gas companies should have known of the negative environmental impact of oil & gas burning.²⁵

Approximately 4% of the Vaca Muerta basin is under development until now. In total, there are approximately 40 companies extracting oil and gas in Vaca Muerta or participating in blocks, including Pan American Energy (BP and CNOOC), Total Austral, Shell, Petronas, Wintershall, Equinor, ConocoPhillips, Chevron, YPF, Tecpetrol, and Vista Oil & Gas.²⁶ In the consolidated production of oil and gas, YPF accounts for 44.7% of the total, Pan American Energy (PAE) for 19.3% and Pluspetrol for 6.2%.²⁷

In 2019, ExxonMobil was very specific on the Vaca Muerta development and stated that the reforms implemented by the federal and provincial governments have been critically important to enabling the development of the Vaca Muerta basin as one of the country's main energy resources.²⁸ This is one example of the narrative that support the development the basin.

3.3 Consultancy firms, rating agency, engineers – supportive narrative

In a 2018 report, PwC applauded the changes made in Argentine government policies to enable international private financing of projects in the country. PwC said that capital attraction will be key to the development of the Vaca Muerta resources. PwC estimated that Vaca Muerta will require an investment of USD 120 billion up to 2030 (USD 8 billion per year).²⁹

Also, the Institute for Energy Economics and Financial Analysis (IEEFA) said that the question for Argentina is whether its economic problems will undermine its ability to develop the Vaca Muerta oil and gas reserves.³⁰

According to Standard & Poor's (S&P) Global, the leading rating agency, the production of gas "*could surge . . . to make Argentina a rival to Australia and Qatar in the LNG market at a time when demand is growing.*"³¹

Daniel Rosato, chairman of the Argentine Petroleum Section of the Society of Petroleum Engineers (SPE) spoke in 2018 about the challenges that oil and gas companies face in Argentina, why costs matter and how they can be lowered, and the outlook for the development of the domestic industry.³² His narrative is that the reserves and opportunities are like in the USA, but that the cost efficiency is too low. An own efficient energy sector system and financing, with no bottlenecks in importing machines, better transport, needs to be developed. At USD 50 per barrel also the USA model does not work. But by paying a bit more (via subsidies), Argentina could develop an own industry.

3.4 Financers involved in Vaca Muerta oil & gas – narrative is supportive

Between 2016 and 2020, the following top 10 financers have provided financial services to the companies active in Vaca Muerta oil & gas: JPMorgan Chase (United States), Citigroup (United States), Bank of America (United States), HSBC (United Kingdom), BNP Paribas (France), China Development Bank (China), Morgan Stanley (United States), Santander (Spain), Barclays (United Kingdom) and Mitsubishi UFJ Financial (Japan).³³

The following two names do not belong to the top-30 bankers nor to the top-30 investors that are financing (globally) the 40 oil & gas companies active in the Vaca Muerta basin.

- As a crucial bank in Argentina, BBVA (Spain) quotes Exxon that once Vaca Muerta is up and running, the US and Argentina will together account for 30% of the world's gas production. BBVA: "*The U.S. Department of Energy calculated that combined, U.S. and Argentina's shale gas and shale oil resources account for 32% of the world's crude and 10% of its natural gas.*"³⁴
- Investors in Argentina also contribute to a narrative where international financing of Vaca Muerta development should become less restricted. Integra Capital, which has invested in Vaca Muerta, indicates that "*Argentina faces no choice but to improve its investment conditions to bring down financing and operating costs if it wants Vaca Muerta to be developed.*"³⁵

In general, the leading banks in the world remain very supportive in the financing of fossil fuels, at a time where zero-emission commitments have become very popular. Fossil fuel financing from the world's 60 largest banks has reached USD 4.6 trillion in the six years since the adoption of the Paris Agreement (2015), with USD 742 billion in fossil fuel financing in 2021 alone. Overall fossil fuel financing remains dominated by four banks from the USA – JPMorgan Chase, Citigroup, Wells Fargo, and Bank of America. These together account for one quarter of all fossil fuel financing identified over the last six years.³⁶

3.5 Argentine government - supportive

In developing shale oil & gas fields, the government might earn royalties and potentially sharing of proceeds. Moreover, it owns the main operator in the Vaca Muerta, YPF. Furthermore, the economy might benefit from foreign exchange proceeds, an improved trade balance and higher employment levels, which are all short-term positive for a president that wants to be re-elected. To get the Vaca Muerta production growing, the government has spent resources on subsidies, despite the fact that it will face a more difficult route in its carbon reduction targets. In 2019, subsidies increased emissions by 26 MtCO_{2e}, which represent 7% of the country's total GHG emissions.³⁷

The Argentine authorities' support for Vaca Muerta as the driver of the national economy became clear when the country held the G20 presidency (December 2017 to December 2018). The former Argentine government supported the narrative that gas was a bridge fuel for the global market transition.³⁸ There is no evidence that the current government has a different stance.

In 2020, the Argentine government proposed a USD 5.1 billion subsidy program for 2021-2024 to fund gas drillers, to prevent a jump in import expenditures: in four years, the savings could be USD 2.6 billion including replacing cheap LNG import effects. Drillers will receive a certain price per thermal unit, consumers pay less, and the government will pay the difference.³⁹

Argentina's state oil company YPF is poised to particularly benefit from the scheme. The firm has the largest upstream market share of any producer in the country with 42% of domestic oil production and 33% of its gas output. YPF is also the most important shale producer in Argentina, with the largest acreage footprint. Around 31% of its reserves are unconventional and c.21% of its output is derived from shale. Government support from subsidies will help YPF continue to focus on lower-cost shale production and further promote development of the Vaca Muerta basin with key international partners.⁴⁰

3.6 Gas hungry European governments are pushing for Vaca Muerta development

After the start of the invasion in Ukraine by Russia and the plan to reduce gas imports from Russia, governments in the European Union are actively looking for other oil and natural gas suppliers. In May 2022, the Argentine President Alberto Fernández visited the Spanish Prime Minister Pedro Sánchez and the German chancellor Olaf Scholz. They discussed Argentina's needs to build an infrastructure in 3-4 years for LNG and to secure trading partners. Fernandez talked about constructing a second gas pipeline and a plant to liquify the gas into LNG. The Spanish Prime Minister highlighted the productive development of local Argentine companies which are needed to advance in various agreements on the export of energy.

The German chancellor focused his comments on the Argentine potential in producing renewable resources (green hydrogen). Probably this comment was meant for the domestic coalition partner, the Greens, as well as for the EU Green Deal commitments. The Argentine President translated the German statement later as a support for the Vaca Muerta development and that Argentina has a lot to offer to the European Union in reaction to the Russian military aggression.⁴¹

3.7 The IMF and The World Bank – supportive

There is a distinction in the goals of IMF and the World Bank in relation to countries and the financial system. From the start, the IMF, as a lender of last resort, is focused on supporting countries to restore their liquidity and solvency position, in order to remain connected to the international financial markets. In this way, the global repercussions can be limited. The World Bank and its affiliates are focused on improving the infrastructure on the ground in poor countries in order to structurally improve the economy and the living standards of the population.

In the last six decades, Argentina already had 22 debt restructurings with the support of the International Monetary Fund (IMF).⁴² After the USD 57 billion stand-by agreement (SBA) in 2018, the USD 44.5 billion structuring in 2022 is the last one. The new agreement does not include

spending cuts by the government, according to President Fernandez. Argentina has more than 50% inflation, pressure on its exchange rate, dwindling central bank reserves and large repayments to the IMF to do. At the time of announcement, financial markets were positive on the news as the market value of government bonds that mature in 2030 climbed slightly to 33.2 cents on the dollar.⁴³

In case of possible future defaults, economists are in general supportive for a haircut on public debt by international financial institutions (banks, investors) as well as by IMF. Indications of a haircut from the 2020's debt versus GDP (>100%) to 60% have been proposed, and the IMF should also contribute. Main argument is that the IMF gave a large loan in 2018 while it knew that Argentina was not ticking all the four boxes for the "exceptional access criteria" (EACs).⁴⁴

In the following section, the policies and execution of the IMF and The World Bank will be analysed, and how these have been supportive for the development of the Vaca Muerta basin and/or the fossil fuel industry in Argentina in general.

3.7.1 IMF and policies on climate change – until 2021 "unstructured and ad-hoc"

Only since 2021, the IMF has become increasingly active in global climate discussions by publishing a series of policy papers, actively communicating on climate issues, and advocating for global solutions. The new Climate Strategy emphasizes the significant impacts that climate risks, climate policy actions as well as adaptation and transition needs will have on macroeconomic stability. It envisions integrating climate change into most surveillance and capacity development activities. The IMF's activities are defined by the Articles of Agreement and the Integrated Surveillance Decision, which indicate that the IMF should cover climate change adaptation and the management of the transition to a low-emission economy in its surveillance activities when the associated policy challenges are macro-critical. Although IMF has entered climate discussions since 2008, until 2021 its engagement has been characterized as unstructured and ad-hoc, and mainly consisted of bi-annual flagship reports and policy papers.⁴⁵

Now the IMF says that climate change presents a major threat to long-term growth and prosperity, and it has a direct impact on the economic wellbeing of all countries. The fund indicates that it has *"a role to play in helping its members address those challenges of climate change for which fiscal and macroeconomic policies are an important component of the appropriate policy response."*⁴⁶ For large emitters, the IMF will strongly encourage Article IV coverage of mitigation policies. Furthermore, IMF will focus on green public investment management.⁴⁷

On its website, IMF' says its policy guidance relates to mitigation, adaptation, and transition to a low-carbon-economy.⁴⁸

- In mitigation, the IMF focus is on advice on measures to contain and reduce emissions, like increasing carbon taxes, reducing fuel subsidies and improving regulation.
- Adaptation is about building financial and institutional resilience to natural disasters/extreme weather, and infrastructure investments to cope with rising sea levels, for instance.
- Transition: this includes updates to financial sector regulation to cover climate risks and exposure to "brown" assets. It also includes measures to help countries to diversify away from carbon intensive activities, while mitigating social impact.

The IMF is planning to take an approach where the starting point would typically be a country's NDC. IMF lending is increasingly linked to removing energy subsidies or preparing disaster resilience strategies. On top of this, IMF is currently considering establishing a new Resilience and Sustainability Trust. This would entail policy programs and financing to address longer-term prospective balance of payments needs with a possible initial focus on climate, pandemic preparedness, and digitalization.⁴⁹

3.7.2 IMF's USD 57 billion restructuring plan in 2018 – the main elements

The IMF decided not to require a significant sovereign debt restructuring before agreeing to the 21st Stand-by Agreement (SBA). That agreement was initiated in June 2018, with the government of former Argentinian President Mauricio Macri. By October 2018, the USD 50 billion lending facility had been increased to USD 57 billion (1,227% of Argentina's IMF quota), but by the following August (2019), the SBA had been suspended, with USD 44.5 billion paid out – the largest disbursement in the IMF's history. The inevitable sovereign default (Argentina's ninth since independence) came in May 2020. In the absence of capital controls, the IMF lending seems to have enabled capital flight.

Because of its size, the 21st SBA had been subjected to the IMF's revised Exceptional Access Framework, which requires that borrowers meet four "exceptional access criteria" (EACs). The country must have:

- large balance-of-payments needs;
- sustainable public debt;
- prospects for regaining access to private capital markets; and
- the institutional and political capacity and commitment to implement an IMF-supported program.

It should have been clear that Argentina met only one of the EACs (large balance-of-payment needs) in 2018.

The main narrative of the bail-out plan, or SBA, consisted of the following points:

- At the core of the government's economic plan was a rebalancing of the fiscal position: accelerate the pace at which the government reduces the federal government's deficit, restoring the primary balance by 2020.
- Reducing inflation through supporting the Central Bank's decision to adopt realistic and meaningful inflation targets and their commitment to maintain a flexible and market-determined exchange rate. Also, the Central bank will stop monetary financing of the budget deficit.
- Protect the most vulnerable as the economic reform moves forward. A floor on social assistance spending.
- To level the playing field between Argentine men and women notably by introducing reforms in the tax code and social legislation.

The plan is meant to keep Argentina connected to international financial markets. Lenders to Argentina (funders of public debt) are asked to commit to a restructuring, consisting of:

- A coupon cut, which is the largest part.
- A much smaller part: a reduction of the principal payment.
- Finally, maturities are pushed further away in time.

3.7.3 The IMF analysis on the 2018 restructuring and failure

IMF's analysis of the failure of the 2018 program has shown a development, thus has changed during the years that followed. In first instance, the IMF focus was on weak macro-economic conditions. In 2022 at the start of the new program (the 22nd one), **the focus was much more on the failing energy subsidies.**

On 22 December 2021 the IMF published an Ex-Post Evaluation (EPE) of Argentina's Exceptional Access Under the 2018 Stand-By Arrangement. An Ex-Post Evaluation is required in all cases of IMF lending above normal borrowing limits to review performance against original program objectives, discuss whether the program design was appropriate, and assess whether the program was consistent with Fund policies.⁵⁰

The strategy of the USD 57 billion plan focused on fiscal and monetary tightening, combined with targeted structural reforms, **to attract renewed capital inflows**.

The Ex-Post Evaluation report concludes the following:

- The program did not deliver on its objectives, despite significant modifications of economic policies.
- Mounting redemptions, along with capital flight by residents, put considerable pressure on the exchange rate. Despite foreign currency interventions, the exchange rate continued to depreciate, increasing inflation and the peso value of public debt, and weakening real incomes, especially of the poor.
- In sum, the program did not fulfil the objectives of restoring confidence in fiscal and external viability while fostering economic growth.
- The program went off track in August 2019 with only four of the planned twelve reviews completed by the Executive Board. The authorities decided to cancel the arrangement on July 24, 2020.

The IMF said that truly restoring confidence would have required:

- **Improving public finances.**
- **Expanding the export base.**
- Addressing structural challenges.
- Sowing the seeds that the reforms to these ends would be durable.

In a fourth review of the 2018 SBA, the IMF said:

- Argentina continues to maintain access to domestic financial markets, where resident and non-resident investors have continued to participate in peso- and U.S. dollar-denominated bond placements.
- **Also, in June, the state-owned oil and gas company successfully issued a 10-year global bond.**

Structural problems in the execution of the 2018 program:

- Continuing high inflation (80% during the program) eroded real incomes, due to exchange rate weakness and high inflation expectations.
- 70% of government debt is linked to the US Dollar, and maturities were short.
- Current account was hurt in 2018 by high imports; however, imports declined strongly from 2017 to 2019 (by 25%) due to lower investment good imports. Exports were stable as agriculture was hurt by drought. **Non-agricultural exports did not respond to peso weakness as invoicing was mainly in USD. This undermined international reserves.**

The IMF stresses the need for efficiency of subsidies versus un-targeted subsidies in the past, as well as the need for growth of energy production and transportation. The IMF indicates that (un-targeted = consumer) subsidies need to come down. This means probably that subsidies need to go to oil & gas companies and/or financiers in order to attract international capital streams.

3.7.4 IMF and the new March 2022 agreement – narrative still oil & gas supportive

On 3 March 2022, IMF and Argentina agreed to a new staff-level agreement,⁵¹ which was approved on 25 March by the IMF board.⁵² Main points include:

- A 30-months Extended Fund Facility (USD 44 billion) for balance of payment and budget support, to enhance the prospects of all Argentines by implementing measures designed to promote growth and protect essential social programs.
- The Executive Board's decision allows the authorities an immediate disbursement of SDR 7.0 billion, equivalent to USD 9.66 billion.

- Address high inflation, and therefore end monetary financing of the budget and target positive real interest rates to incentivise domestic financings.
- Improving public finances, **including ending un-targeted energy subsidies.**
- Strengthen balance of payments through policies that **support reserve accumulation and net exports, and which will pave the way to an eventual re-entry by Argentina into international capital markets.** This is supported by prudent monetary and budgetary policy aimed at maintaining a competitive real effective exchange rate.
- Various social and gender policies to be strengthened.
- **Promote the sustainability and efficiency of strategic economic sectors including energy.**
- Challenges to sustained and inclusive growth persist. **Export remain relatively small, and the export base is insufficiently diversified.** Dollarization remains high and domestic capital markets underdeveloped, limiting Argentina's capacity to sustainably finance investment and growth over the medium term.
- Balance of payment problems remain. Argentina's balance of payment needs are mostly due to the schedule of repayments to the IMF.

Conclusion: In the new agreement, the IMF makes many remarks about reducing un-targeted energy subsidies but also talks about increasing energy production and transportation. **Within its analysis, IMF focuses on real incomes and gender. There is a lack of focus on environment and climate change, and certainly not on the externalized costs of health care and the risk of stranded assets.**

Finally, a crucial element in IMF's recommendations is access to international capital markets for Argentina. Exchange rate controls and capital flow restrictions reduce the attractiveness for international (oil) companies and financiers to invest as their returns cannot be repatriated to foreign investors.⁵³

3.7.5 IMF and Vaca Muerta – only mentioned one time in IMF reports

The Vaca Muerta project is mentioned as supporting the resilience of export value, as the Argentinean government was reducing tax reimbursements to exports. In a footnote the IMF says that the *"net negative impact on exports is expected to be small since the measure will likely be offset by an increase in the productive capacity from last year's strong investment in export industries, a rebound of agricultural exports after the drought, and an expected increase in energy exports as production in the Vaca Muerta basin picks up."*⁵⁴

3.7.6 The World Bank, IFC and IDA

In the World Bank's IFC (International Finance Corporation), there is substantial project financing support for oil and gas development in Argentina and the Vaca Muerta region. In 2015, Pan American Energy received USD 400 million of financing.⁵⁵

Additionally, IFC financing approved in 2011 is used to further develop Medanito's exploration and producing assets in the province of Neuquén, whose area includes the Vaca Muerta formations. Medanito is a mid-size Argentinean company active in conventional oil and gas, and in shale oil & gas. Funds may also be used to acquire new hydrocarbon assets. The areas where the company operates are sparsely populated and land generally belongs to the government or to large scale landowners. IFC planned to invest equity (USD 25 million) for its own account and mobilize investments from third parties, for a total of up to USD 50 million in a total project of USD 137 million.⁵⁶

The World Bank's IDA (International Development Association) has currently no projects in Argentina.

3.8 Regional development banks

On 27 January 2022, CAF (Development Bank of Latin America) granted a USD 300 million loan to YPF to support its climate change adaptation and mitigation strategy. Through this loan, CAF confirms its commitment to continue supporting the country and its productive sector. The transaction marks an important milestone since it means the return of YPF to the international financial market. It is also one of YPF's first financings aligned with emissions reduction (**only Scope 1 and maybe 2, not Scope 3**), climate change mitigation and green projects. The loan structure is such that commercial parties are included:

- Santander (USD 90 million),
- Itau Unibanco (USD 60 million),
- Industrial and Commercial Bank of China Limited,
- ICBC Dubai (DIFC) (USD 60 million) and
- Cargill Financial Services International (USD 52.5 million).

In 2019, Overseas Private Investment Corporation (OPIC; in 2019 succeeded by U.S. International Development Finance Corporation) considered to approve two fracking projects in Argentina. These projects would be located in the Vaca Muerta formation and were in total USD 800 million.⁵⁷

3.9 G20 presidency and ministerial meeting on energy - supportive

The Argentine authorities' bet on Vaca Muerta as the driver of the national economy became clear when the country held the G20 presidency (December 2017 to December 2018), where they insisted with a discourse that positions gas as a bridge fuel and raised the need to strengthen the global market. In June 2018, at the G20 Ministerial meeting on Energy, the Secretary of the US Department of Energy, Rick Perry, offered technical assistance to Argentina to build the infrastructure that Vaca Muerta needs, specifically attracting pipeline developers and petrochemical companies.⁵⁸

3.10 Conclusion about the stakeholders' narrative – supportive

There is a large group of stakeholders contributing to a narrative that fossil fuels expansion and investments are needed, at a time that the environmental impact of fossil fuels has already been recognized since the Rio Summit in 1992. Also, after the Paris 2015/COP21 agreement, most individual stakeholders continued to contribute to a narrative that oil & gas expansion, globally and in Argentina, are needed to grow an economy, to solve balance sheet and foreign currency reserve problems, to become self-sufficient and/or to use it as a transition fuel. This occurs despite an increasing number of zero-emission commitments.

In relation to Argentina, supportive fossil fuel narratives and execution can be found at oil & gas companies, consultancy firms, financiers (banks, investors), customers/importing countries of oil & gas, the Argentine government, the IMF and the World Bank, regional development and finance institutions as well as the G20.

Concerning the Vaca Muerta, many crucial members in the various groups of stakeholders have developed a supportive narrative, sometimes directly and sometimes indirectly. Currently, the most supportive narratives can be found among some consultancy firms, several financiers, several EU member states which are under pressure from a boycott of Russian oil & gas, and the Argentine government. The World Bank and regional development financing institutions continue to support financing of the exploitation of the Vaca Muerta basin. Finally, the IMF remains the large conductor to keep the economic world order intact, with some minor adaptations to ESG and effectivity. The Vaca Muerta basin is mentioned only one time, as contributor to an improvement of export.

In their actions on Argentina, the IMF focuses strongly on bringing the country back in the international financial market based on the well-known playbook. The IMF is asking more attention for equality and gender, more export diversification away from agricultural products, and an adjustment to more effective energy subsidies while the subsidies continue to exist to attract international companies and financing. There is no narrative related to Vaca Muerta about high societal costs (carbon emissions, oil/gas spills, health costs). Also, no real assessment of stranded asset risk is discussed.

Vaca Muerta is embedded in the need to integrate a country in the economic world order, including a diversified energy supply. In this context, the NGO Ejes' viewpoint about the position of Argentina in the global value chains seems to be supported by all narratives. In that viewpoint, Argentina has a subordinate role in international capital markets and global value chains as it needs the financing and knowledge of multinational companies and international banks/investors for its development. *"The State is forced to grant benefits in the form of subsidies to lure capital in order to share financing risks. These public-private endeavours create countless problems and challenges for Argentina that do nothing but replicate the country's underdevelopment."*⁵⁹

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