

# **ARGENTINE ENERGY SECTOR REPORT**

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### **Argentine Energy Sector**

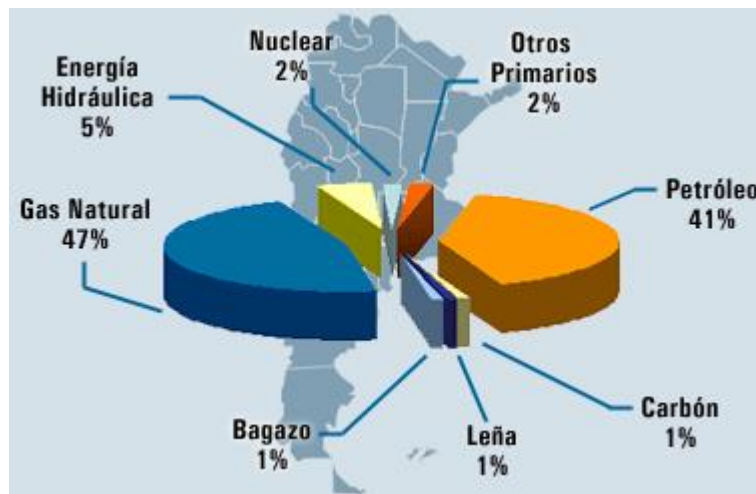
The primary energy sources that Argentina has been using since 1970 are: Petroleum, Natural Gas, Mineral Carbon, Hydraulic, Nuclear and Biomass.

Liquid and gas hydrocarbons have represented always a substantial part of the power consumption, natural gas being the main source of energy.

Due to the demand of electrical equipment, the use of Combined Cycles (electrical energy using hydrocarbons) is intensified because of its lower cost of investment and reduced installation time, in detriment of Hydropower and nuclear energy.

In summary, both in Primary Energy generation and Electrical Energy generation, Hydrocarbons appears to account for more than 88%. Therefore, it can be said that Argentina is dependent on hydrocarbons.

**Graphic 1: Distribution of Energy Resources in Argentina**



Source: Gas Natural Fenosa

## **OIL AND NATURAL GAS SECTOR (HYDROCARBONS)**

The Oil and Natural Gas Sector include the exploration and production of petroleum and natural gas; its transport through pipelines; refining of petroleum and the treatment of gas; and the transport, storage and the commercialization (domestic and external) of hydrocarbons and their sub products.

Exploration and production are done in hydrocarbon basins. The raw materials are transported through pipelines, by land or water, until the places of transformation. The gas separation plants are usually next to the extraction zone, while oil refineries are located near large centers of consumption or logistical "knots" with port facilities of magnitude.

From the processing of gas in separation plants comes network gas (for residential or industrial use), liquefied petroleum gas and other gases for petrochemical use. In 2012 around 34,6% of natural gas was used to generate electrical energy; 28% was required by the industry; 24.1% was consumed residentially and the rest was distributed between compressed natural gas (CNG), commercial and others.

Some 93.5% of refined products of petroleum supply the liquid fuel demand (gas oil; regular, super and ultra naphtha; fuel oil, kerosene and fuel for aviation) and 6.5% is used as input for the petrochemical industry.

Transport is done, mainly, through oil and gas pipelines, and in a smaller manner with tank trucks. There is an import storage infrastructure for fuels, controlled mainly by the refining companies.

In the local market, fuel sales are done through two channels: wholesaler composed mainly by large oil companies that supply transport fleets of goods and passengers, the agricultural sector (mainly gas) and gas stations; and the retail formed by gas stations and some small independent distributors.

Regarding the foreign market, there are gas pipelines through which gas is transported mainly to Chile, and in a smaller scale to Brazil and Uruguay.

In the extraction stage there is an important economic concentration: four companies (YPF, Pan American Energy, Petrobras and Chevron) consist of around 65% of the petroleum extraction and 75% of gas (YPF, Total Austral, Petrobras and Pluspetrol).

A similar pattern applies to the processing stage, where the degree is even greater: three firms (YPF, Shell and Esso) represent more than 80% of the refining capacity.

The transport of oil is done mainly through a network of pipelines of YPF while gas is done by a network of central gas pipelines of two concessionaries (TGS and TGN). In the distribution of natural gas to final customers intervene a dozen of companies, each one having a monopoly of the activity in their respective region.

Commercialization of fuels in the retail sector is done through 3.600 service stations that mainly sale the brands of the four leading firms (YPF, Shell, Esso and Petrobras) in the refining segment. The rest sale brands of smaller operators that don't have their own refining structure.

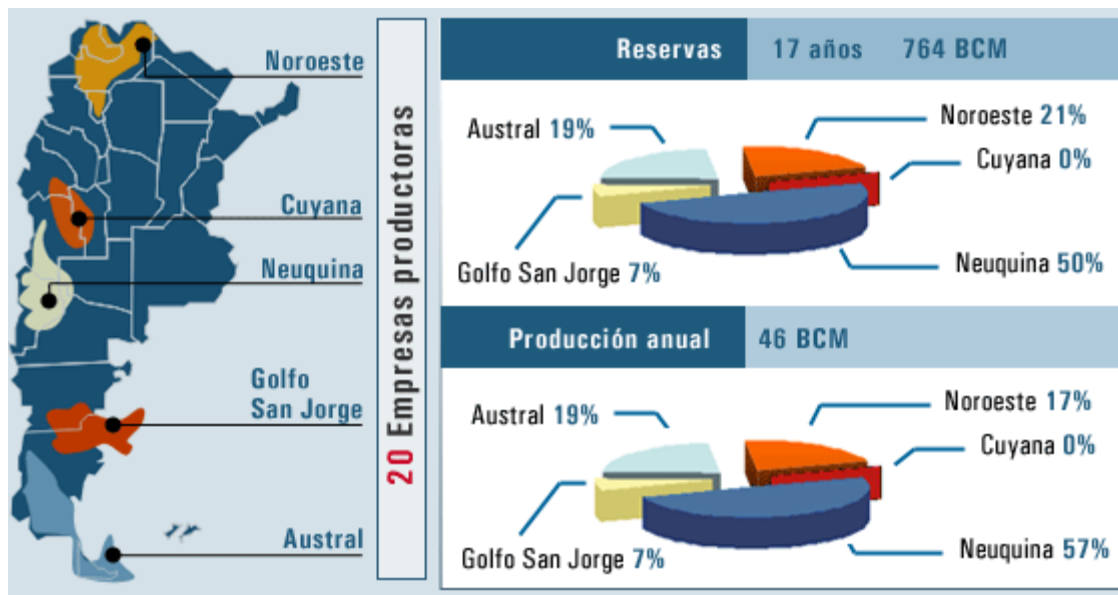
### **Regional distribution of Oil:**

According to the Ministry of Economy report from 2011 based on 2010 production, Chubut is the main producer of oil of Argentina with 27%, followed by Neuquén with 22%, Santa Cruz with 20% Mendoza with 15% and the rest with 16%.

### Regional distribution of Natural Gas:

According to the Ministry of Economy report from 2011 based on 2010, production of natural gas is strongly concentrated in Neuquén with 48%. In very inferior levels is followed by Salta with 11% and Santa Cruz with 9%, Tierra de Fuego with 9%, the National State 8%, Chubut 7%, Mendoza 5% the rest with 3%.

**Graphic 2: Distribution of Natural Gas Reserves and Production by Regions**



Source: Gas Natural Fenosa

Table 1

Proven Petroleum Reserves – 1000 m3							
Basin	2005	2006	2007	2008	2009	2010	2011
Austral	14.788	14.538	15.464	14.559	13.650	13.451	12.943
Cuyana	27.783	24.926	25.153	26.279	33.618	33.543	33.056
San Jorge Gulf	179.294	252.190	248.903	247.835	244.422	253.758	257.969
Neuquina	118.045	111.976	114.181	105.236	100.316	94.262	84.912
Northeast	9.154	7.633	8.596	6.783	7.290	6.308	5.115
Total	349.064	411.263	412.297	400.692	399.296	401.322	393.995

Source: IAPG (Instituto Argentino del Petróleo y el Gas- Argentine Institute of Petroleum and Gas)

Table 2

Proven Natural Gas Reserves – 1000 m3							
Basin	2005	2006	2007	2008	2009	2010	2011
Austral	123.704	123.638	122.799	116.219	114.041	106.559	103.945
Cuyana	312	692	519	566	925	1.081	1.062
San Jorge Gulf	35.501	43.642	41.046	42.963	44.397	45.915	48.552
Neuquina	204.665	202.543	194.265	176.889	157.613	161.535	145.291
Northeast	74.739	75.641	83.284	61.893	61.845	43.643	33.643
Total	438.921	446.156	441.913	398.530	378.821	358.733	332.493

Source: IAPG (Instituto Argentino del Petróleo y el Gas- Argentine Institute of Petroleum and Gas)

Table 3

<b>Annual Petroleum Production (m3)</b>			
Year	Primary Production	Secondary Production	Total Production
2001	29.630.984	15.803.469	45.434.453
2002	28.553.986	15.556.340	44.110.326
2003	27.810.217	15.312.590	43.122.908
2004	25.743.916	14.908.165	40.652.082
2005	24.400.459	14.231.748	38.632.208
2006	24.085.422	14.184.483	38.269.905
2007	22.348.843	14.960.176	37.309.019
2008	21.963.014	14.665.782	36.647.683
2009	21.335.148	14.804.752	36.150.189
2010	20.690.140	14.610.743	35.314.086
2011	19.463.219	13.759.500	33.233.320
2012	19.915.276	13.090.411	33.151.596

Source: IAPG (Instituto Argentino del Petróleo y el Gas- Argentine Institute of Petroleum and Gas)

Table 4

<b>Annual Gas Production Mm3</b>				
Year	Low Pressure Gas	Medium Pressure Gas	High Pressure Gas	Total Gas Production
2001		45.974.047		45.974.047
2002		45.889.063		45.889.063
2003	9.295.922	21.327.962	20.008.630	50.632.514
2004	10.898.548	28.040.948	13.444.935	52.384.431
2005	13.505.167	24.610.067	13.457.511	51.572.745
2006	15.447.804	22.728.086	13.602.640	51.778.530
2007	21.014.612	18.353.513	11.638.118	51.006.244
2008	24.228.690	15.168.753	11.117.052	50.514.496
2009	24.285.743	14.017.087	10.115.656	48.418.486
2010	24.830.356	15.493.693	6.785.273	47.109.321
2011	23.975.807	16.049.033	5.498.893	45.523.733
2012	24.719.750	15.780.768	3.622.847	44.123.365

Source: IAPG (Instituto Argentino del Petróleo y el Gas- Argentine Institute of Petroleum and Gas)

Table 5

<b>Petroleum and Natural Gas Production - Year 2012</b>		
Operator	Petroleum m3	Natural Gas Mm3
AMERICAS PETROGAS ARGENTINA S.A	91.740	9.158
APACHE ENERGIA ARGENTINA S.R.L	380.447	1.704.555
APACHE PETROLERA ARGENTINA S.A.	39.619	14.446
ARGENTA ENERGIA S.A.	-	51
ARPETROL ARGENTINA S.A	12.739	15.316
CAPEX S.A.	46.438	629.779
CENTRAL INTERNATIONAL CORPORATION	87.794	7.972
CGC	4.256	26.468
CHAÑARES HERRADOS S.A.	188.526	7.365
CHEVRON ARGENTINA S.R.L.	1.724.433	249.270
COLHUE HUAPI S.A.	27.201	5.354
COMPAÑIAS ASOCIADAS PETROLERAS S.A.	630.897	27.243
CRI HOLDING INC; SUCURSAL ARGENTINA	4.904	96

<b>Petroleum and Natural Gas Production - Year 2012</b>		
<b>Operator</b>	<b>Petroleum m3</b>	<b>Natural Gas Mm3</b>
DAPETROL S.A	20.747	-
ENAP SIPETROL ARGENTINA S.A.	579.287	736.390
ENARSA	31.183	1.242
ENERGIAL S.A.	12.365	-
EPSUR S.A	12.402	3.554
GAS Y PETROLEO DEL NEUQUEN S.A.	1.959	749
GEPARK ARGENTINA LIMITED (SUC.ARG)	2.892	874
GOLDEN OIL CORPORATION SUC.ARG.	2.660	1.022
GRAN TIERRA ENERGY ARGENTINA S.R.L.	102.698	12.787
GRECOIL Y CIA. SRL	10.179	3.218
INGENIERIA ALPA S.A.	32.380	2.986
INGENIERIA SIMA S.A.	1.868	
INTERENERGY ARGENTINA S.A.	1.698	1
JHP INTERNATIONAL PETROLEUM LTD.	17.881	4.782
MEDANITO S.A.	128.141	178.301
MISAHAR ARGENTINA	344	227
NECON S.A.	2.100	-
OILSTONE ENERGÍA S.A.	68.118	40.734
PAN AMERICAN	5.929.031	5.275.505
PANAPETROLEO	30	
PETROBRAS ARGENTINA S.A.	2.258.286	3.988.136
PETROLEOS SUDAMERICANOS S.A.	94.815	10.578
PETROLERA CERRO NEGRO S.A.	27.206	21.849
PETROLERA DEL COMAHUE S.A.	1.072	-
PETROLERA EL TREBOL	110.232	3.330
PETROLERA ENTRE LOMAS S.A.	860.844	418.091
PETROLERA LF COMPANY S.R.L	264.145	1.380.995
PETROLERA PATAGONIA S.R.L.	6.577	-
PETROLERA SAN JOSE S.R.L.	20.632	2.514
PETROLIFERA P. (AMERICAS) LIMITED	92.271	62.676
PETROQUIMICA COM. RIVADAVIA S.A.	394.612	259.534
PLUSPETROL ENERGY S.A	83.907	1.243.855
PLUSPETROL S.A.	2.225.169	1.268.397
QUINTANA E&P ARGENTINA	513	49
ROCH S.A.	222.606	670.223
SAN JORGE PETROLEUM S.A	39.761	40.130
SINOPEC ARGENTINA EXPLORATION INC	2.190.527	746.696
TECPETROL S.A.	1.336.859	1.456.959
TOTAL AUSTRAL S.A.	1.035.839	13.262.692

<b>Petroleum and Natural Gas Production - Year 2012</b>		
<b>Operator</b>	<b>Petroleum m3</b>	<b>Natural Gas Mm3</b>
UNITEC ENERGY S.A	3.909	557
YPF S.A.	11.583.450	10.326.663
<b>Total</b>	<b>33.050.187</b>	<b>44.123.365</b>

Source: IAPG (Instituto Argentino del Petróleo y el Gas- Argentine Institute of Petroleum and Gas)

Table 6

<b>Production by Company - Year 2012</b>															
<b>Companies</b>	<b>CARBOCLOR S.A</b>	<b>DAPSA</b>	<b>ENARSA</b>	<b>ESSO SAPA</b>	<b>FOX PETROL</b>	<b>NEW AMERICAN OIL</b>	<b>OIL COMBUSTIBLES S.A.</b>	<b>PETROBRAS ARGENTINA S.A.</b>	<b>PETROLERA ARGENTINA S.A</b>	<b>POLIPETROL S.A.</b>	<b>REFINADORA NEUQUINA S.A.</b>	<b>REFINOR S.A.</b>	<b>SHELL CAPSA</b>	<b>YPF S.A.</b>	<b>TOTAL</b>
Total National Oil (m3)	0	7.361	116.831	4.922.856	2.174	85.892	1.665.267	1.671.296	0	42.674	83.516	571.573	4.558.411	16.762.890	<b>30.490.740</b>
Total Imported Oil (m3)												247.866			<b>247.866</b>
Additives for Lubricants (m3)		2.664		1.770				1.553					2.947		<b>8.934</b>
Bases Lubricants (m3)		28.869		15.220				19.683					14.575		<b>78.347</b>
Biodiesel (m3)		5.212		287	21		44.597	46.637				17.831	125.846	30.141	<b>270.571</b>
Bioethanol (m3)		566					14.194	8.209				6.455	47.325		<b>76.749</b>
Vacuum Distillation(Prod) (m3)				23.254				21.644							<b>44.898</b>
MTBE (m3)		8		32.528			5.278	13.346			26	3.298	87.986	33.825	<b>176.295</b>
Other Mej. octane (m3)					506									299.687	<b>300.193</b>
Kerosene (m3)														263.789	<b>263.789</b>
Solvente (m3)	11.447				31										<b>11.477</b>
Fueloil (ton)			501		428						2.114			53.217	<b>56.259</b>
Total other fuels (ton)	0	69.438	0	71.362	27.516	0	217.166	596.693	503	0	8.573	80.561	170.471	1.539.356	<b>2.781.640</b>
Gas Refinery (Mm3)				235.820	353			179.862		313		28.640	307.467	476.534	<b>1.228.990</b>
Propane (ton)				68.803				14.314			174	5.570	57.776	322.550	<b>469.187</b>
Butane (ton)				108.858				62.425			174	17.718	37.356	272.637	<b>499.168</b>
Regular Naphta (m3)				75.375	209							22.710	43.441		<b>141.735</b>
Super Naphta (m3)		2.242		825.687	4.417		254.454	356.636			701	99.458	1.011.089	2.835.006	<b>5.389.690</b>
Ultra Naphta (m3)		289		169.914	18		38.946	81.456				8.639	398.672	1.071.895	<b>1.769.828</b>



**Production by Company - Year 2012**

Companies	CARBOCLOR S.A	DAPSA	ENARSA	ESSO SAPA	FOX PETROL	NEW AMERICAN OIL	OIL COMBUSTIBLES S.A	PETROBRAS ARGENTINA S.A	PETROLERA ARGENTINA S.A	POLIPETROL S.A	REFINADORA NEUQUINA S.A.	REFINOR S.A.	SHELL CAPSA	YPF S.A.	TOTAL
Virgen Naphtha for Petrochemical Use (m3)		2.476	8.677	33.773			506.829	228.200	663	57	41.676	322.429	164.710	1.635.616	2.945.106
Total Solvents (m3)	10.456			33.211	12.001	9.686		115.772	0	1.501	0		48.491	127.876	358.995
Turpentine (m3)	990			6.878							637		17.416	14.584	40.505
Kerosene (m3)		135				1.491				695			41	21.744	24.106
JP (m3)				382.519									278.622	1.019.596	1.680.737
Gasoil (m3)		67.468		1.793.735	2.045	16.836	655.091	588.660		6.670	11.447	316.788	1.475.691	7.042.727	11.977.158
Diesel (m3)					7.288	5.992				1.080	1.629				15.989
Fuel (ton)		2.139	98.996	662.390	860	25.092	379.783	376.852		27.674	6.959	51.875	872.802	1.406.136	3.911.558
Lubricants (m3)		20.296		29.394				21.291					62.749	122.309	256.039
Greaseston)		4.575		229									1.570	2.919	9.293
Asphalt (ton)		18.906		57.948			53.541	69.626					136.315	195.494	531.831
Coke (ton)				370.044				19.555					168.074	916.021	1.473.694
Lubricant Base(Subprod) (m3)				47									1.670	99.339	101.056
Vacuum Distillation (Subprod) (m3)				18.413			12.995	3.628							35.036
Total other Products (ton)	0	4.246	692	318.296	9.197	18.501	71.724	388.845	0	1.042	17.294	52.180	139.765	1.865.105	2.886.887
Total	22.893	236.890	225.697	10.258.611	67.064	163.490	3.919.864	4.886.183	1.167	81.706	174.920	1.853.590	10.231.278	38.430.993	70.554.347

Source: IAPG (Instituto Argentino del Petróleo y el Gas- Argentine Institute of Petroleum and Gas)

### Vaca Muerta

Vaca Muerta is the main shale formation in Argentina. Its great potential is due to its geological characteristics and geographical location. Its discovery was announced in 2010 by Argentine engineers and scientists of the company Repsol . YPF.

The Vaca Muerta formation is located in the Neuquén Basin, in the southwest of Argentina and has a surface of 30.000 km<sup>2</sup>, of which YPF owns the concession of more than 12.000km<sup>2</sup>. Studies made by YPF in Vaca Muerta have confirmed that it has an enormous potential for the obtaining of natural gas (802 TCF) and counts with important oil resources that reach 27.000 millions barrels, which means multiplying by ten the current Argentine reserves.

A US Department of Energy report shows that Argentina holds more natural gas trapped in shale rock than in all of Europe · a 774-trillion-cubic-foot bounty that could transform the outlook for Western Hemisphere supply.

### **Public Policies:**

With the objective of stimulating exploration, exploitation and refining, from 2008 the programs %Retróleo Plus Petroleum Plus)+and %Refinación Plus (Refining Plus)+by Decree 2014/08 were put into force. The first program contemplates for those who make new investments that increase production and reserves, granting fiscal credits that may be used to cancel export rights, which would indirectly improve the final price of crude oil. The second promotes fiscal incentives for projects of new refineries or for the expansion of the refining capacity of gas oil and naphtha super. At the same time it creates a new special regime for small refineries.

In 2007 Gas Plus program was created by resolution SE 24/08 to improve the profitability of the sector by realizing commercialization prices of gas for those new volumes that are incorporated to the system, as a consequence of investment in areas without exploitation, exploitation areas with particular geological characteristics, areas that aren't in production since 2004 or that being in production or that already in production, add to such production new wells. The destination of such production should be the local market.

This measure is mainly oriented to promote investment in wells of compact sand of the province of Neuquén, where extraction is a lot more expensive.

On its side the Regime of Promotion of Investment (Law No. 26.360) establishes fiscal benefits for those companies that present investment projects for infrastructure works and productive activities with high economic and social impact linked to the generation of electricity, production and exploitation of hydrocarbons; water, road and rail works projects and other projects that allow expanding supply.

Since 2007 exists %Plan Energía Total+(Total Energy Plan), which establishes a scheme of subsidies for electricity generation and industrial production. With this substitution gas volumes channeled to electrical plants may be released.

### **Decree 929/2013 – Promotion regime for Investments for the Exploitation of Hydrocarbons:**

This decree was created in June 11<sup>th</sup> 2013 with the purpose of promoting investment in the hydrocarbon sector and it was created after Chevron decided to create a joint-venture with Argentine oil company YPF, to exploit %Maca Muerta+.

Chapter I: Creates and sets the objectives of the Regime of Promotion of Investment for the Exploitation of Hydrocarbons:

Art. 1 - Creates the Regime for the Promotion of Investments for the Exploitation of Hydrocarbons, in the framework of Laws N° 17.319, 26.197 and 56.741 and will be applied in all the territory of the Argentine Republic.

Art. 2 - The regime will be adjusted to the following principles and purposes will be under federal authority for fixing the National Hydrocarbons Policy:

- a) The harmonious and coordinated development of the National Government and the respective enforcement authorities in hydrocarbon field.
- b) The priority of Argentina to achieve self-sufficiency in oil to ensure economic development with social equity, job creation, increased competitiveness of the various economic sectors and sustainable and equitable growth of provinces and regions.
- c) The increase of investment and resources used for achieving self-sufficiency in hydrocarbons in the short, medium and long term.
- d) The promotion of domestic and foreign direct investment for self-sufficiency in hydrocarbons.
- e) The integration of national and international capital, strategic alliances aimed at the exploration and exploitation of hydrocarbons.

f) The incorporation of new technologies and management strategies that contribute to the improvement of the exploration and exploitation of hydrocarbons, and promoting technological development in Argentina for that purpose.

Chapter II: Requirements and conditions of inclusion in the promotional scheme:

Art. 3 - Those who may apply to be included in the System for Investment Promotion for the Exploitation of Hydrocarbons are subjects enrolled in the National Register of Hydrocarbon Investments that are holders of exploration permits and / or concessions granted National Government, the Provinces or Autonomous City of Buenos Aires, as applicable, and / or third parties associated with these that together with them, submit to the Commission of Strategic Planning and Coordination of the National Hydrocarbon Investment Plan, an "Investment Plan for exploitation of Hydrocarbons" including the direct investment in foreign currency of not less than the amount of one billion U.S. dollars (US\$ 1,000,000,000) calculated at the time of submission of the "Investment Project for Exploitation of Hydrocarbons" and to be invested during the first five (5) year of the project.

Art. 4 - The Commission on Strategic Planning and Coordination of the National Investment Plan for Hydrocarbon Regulations dictate the requirements and conditions for the submission and approval of the "Investment Projects for the Exploitation of Hydrocarbons" under this Decree. That regulation also set the requirements for the inclusion of Investment Projects Promotion Regime.

Art. 5 - Inclusion in the Investment System for the Promotion of the Exploitation of Hydrocarbons subjects mean for beneficiaries a duty to comply with the investment plans and development of reservoirs involved in their respective projects.

Chapter III Benefits:

Art. 6 - Provides that the subjects included in this Promotional System shall, under the terms of Law No. 17,319, from the fifth year from the start of the execution of their "Investment Projects for the Exploitation of Hydrocarbons", will have the right to trade freely in the foreign market twenty percent (20%) of the production of oil and gas produced in these projects, with a rate of zero percent (0%) of export duties, if these project result to be applicable.

The exportable hydrocarbons are calculated periodically by project and for the natural or legal person who has made it, according to the procedure established by the regulation.

Art. 7 - In periods that domestic production of hydrocarbons doesn't meet domestic supply requirements in the terms of Article 6 of Law No. 17,319, the subjects included in this Promotional System shall, from the fifth counted year from the approval and the start of their "Investment Project for the Exploitation of Hydrocarbons", the right to obtain the percentage of oil and gas produced in those susceptible export projects according to year as provided in the first paragraph of the previous article, a price not lower than the export price for the purposes of the determination of the incidence of export duties that may be applicable shall be disregarded.

The Commission on Strategic Planning and Coordination of the National Investment Plan for Hydrocarbon establishes by regulation for that purpose a compensation mechanism payable in pesos.

In this course, framed oil producers in this regime also have priority right to obtain foreign exchange freely available through the Single Free Exchange Market by up to 100% of the price obtained for the internal marketing the percentage of hydrocarbons export susceptible according to the provisions of the first paragraph of Article 6, plus the corresponding amount, if any, to compensation received under this Article, provided that the implementation of "Investment Project for the Exploitation of Hydrocarbons" would have involved foreign exchange earnings to the Argentinean financial center for at least the amount specified in Article 3.

Art. 8 - The provinces and the City of Buenos Aires, within the scope of their respective powers, may grant complementary benefits to the ones set herein.

Art. 9 - The benefits provided for in this Chapter shall cease for the following reasons:

- a) Deadline for concessions.
- b) Expiration of the grant for the reasons referred to in Article 80 of Law No. 17,319.
- c) Substantial breaches in the "Investment Project for the Exploitation of Hydrocarbons" declared by the Commission on Strategic Planning and Coordination of the National Investment Plan for Hydrocarbon.

Art. 10 - The Commission on Strategic Planning and Coordination of the National Investment Plan for Hydrocarbon produces an annual report that accounts for the degree of fulfillment of the objectives promised by the approved projects.

#### Chapter IV: Operating Grants for Unconventional Oil

Art. 11 - Understood for "Unconventional Hydrocarbon Exploitation" extraction of liquid hydrocarbons and / or gaseous by stimulation techniques applied in unconventional deposits in geological formations of shale rock or shale (shale gas or shale oil), compact sandstone (tight sands, tight gas, tight oil), coal seams (coal bed methane) and / or characterized, in general, by the presence of low permeability rocks.

Art. 12 - Pursuant to the provisions of Law No. 17,319, all exploitation concession confers the exclusive right to exploit deposits of conventional and unconventional hydrocarbons that exist in the areas covered by the respective concession during the corresponding periods.

Art.13. - Subjects holders of exploration permits and/or concessions of hydrocarbons, which have been included in the Investment System for the Promotion of the Exploitation of Hydrocarbons, shall have the right to request an "Exploitation Concession of Unconventional Hydrocarbons+.

#### **Imports & Exports:**

Table 7

<b>Petroleum &amp; Natural Gas Imports and Exports of Argentina</b>				
Year	Imports		Exports	
	Petroleum m3	Gas Mm3	Petroleum m3	Gas Mm3
2000	1.719.956	-	15.983.394	4.642.703
2001	1.598.175	-	16.357.929	6.051.465
2002	590.765	-	15.686.050	5.846.338
2003	284.877	-	12.195.792	6.460.540
2004	398.663	794.790	9.316.029	7.348.146
2005	262.194	1.734.946	8.302.652	6.600.108
2006	94.590	1.670.288	5.641.025	6.300.250
2007	45.437	1.756.949	3.392.000	2.662.269
2008	6.536	1.448.530	2.067.338	1.010.304
2009	-	2.672.526	4.365.189	884.383
2010	-	3.612.262	3.908.249	465.690
2011	-	6.909.785	3.249.141	200.176
2012	247.866	9.506.127	3.456.585	106.887

Source: IAPG (Instituto Argentino del Petróleo y el Gas- Argentine Institute of Petroleum and Gas)

Table 8

<b>Natural Gas Imports of Argentina</b>			
Year	From Bolivia	LNG	Total
2000	0	0	0
2001	0	0	0
2002	0	0	0
2003	0	0	0
2004	794.790	0	794.790
2005	1.734.946	0	1.734.946
2006	1.670.288	0	1.670.288
2007	1.756.949	0	1.756.949
2008	959.881	488.649	1.448.560
2009	1.767.557	904.969	2.672.526
2010	1.845.372	1.766.891	3.612.263
2011	2.828.580	4.081.205	6.909.785
2012	4.855.377	4.650.750	9.506.127

Source: IAPG (Instituto Argentino del Petróleo y el Gas- Argentine Institute of Petroleum and Gas)

Table 9

<b>Argentine Energy Exports</b>			
Fuels and Energy	January - October Period		
	2012 (millions USD)	2013 (millions USD)	Variation Percentage %
Crude Oil	2.294	1.623	-29
Fuels	2.555	2.198	-14
Lubricant Oils and Grease	90	60	-33
Petroleum Gas & other gas hydrocarbons	598	532	-11
Electrical Energy	132	-	-100
Other Fuels	93	99	6
Total	5.767	4.512	-22

Source: INDEC

Energy exports represented 6% of the total Argentine exports for the first ten months of 2013.

Table 10

<b>Argentine Energy Imports</b>			
Fuels and Lubricants (chosen products for statistics)	January - October Period		
	2012 (millions USD)	2013 (millions USD)	Variation Percentage %
Crude Oil	2664	1623	-671
Biodiesel	1616	997	-620
Naphtha for petrochemical	448	219	-229
Petroleum Liquified Gas	158	119	-39
Liquified Butane	169	145	-24
Other Fuels	565	552	-6
Total (Fuels and lubricants)	8.174	10.304	26

Source: INDEC

Argentine imports of fuels and lubricants in the first ten months of 2013 represented 16% of all imported products.

On January 9, 2013, Argentina unveiled a new system of export duties on oil shipments that will cut levies as the government seeks to attract investment to revive stagnant production. The change means energy companies will receive 70 dollars per barrel of exported oil, up from 42 previously. Argentina controls the price of oil exports in order to guarantee domestic supply.

Until now the state kept the difference between the international price for Argentine crude - between 80 and 90 dollars per barrel in January when the change was put into force- and the reference price of 42. The reform means that the state will only retain the difference between the market prices and 70, meaning increased revenue for oil companies that export crude.

In late November the Government announced a new incentive program to last until 2017 for small scaled companies that dispatches natural gas less than 3.5 million m3 per day. According to the program, some 676.7 million USD worth of subsidy will be given to the relevant companies where it will be increased to 7.5 USD/million Btu from 2.5 USD/million Btu currently, due to the increased production. The Government estimates a 17% production increase thanks to this new program.

## **NUCLEAR ENERGY**

The Atomic Energy Commission of Argentina (Comisión Nacional de Energía Atómica, CNEA) was established in 1950 and led a series of activities focused on the research and development of nuclear energy, including the construction of several nuclear research reactors. They are currently operating five research reactors with plans to build a sixth reactor.

In 1964 Argentina became fully interested in nuclear energy and conducted a feasibility study to build a plant in the region of Buenos Aires of 300 to 500 MW. National policy was strongly based on the use of heavy water reactors using natural uranium as fuel. The most attractive offers and finally accepted were those of Canada and Germany. As a result, Atucha I nuclear plant was built in Lima, 115 km northwest of Buenos Aires.

Nuclear plant Atucha I went into operation in 1974, and it became the first nuclear power plant in Argentina. Atucha I produces 357 MW for the Argentine electricity system.

In 1967, a second feasibility study of a larger reservoir in the Córdoba region was performed, 500 km inland. In this case, a CANDU-6 reactor from the Atomic Energy of Canada Ltd. (AECL) was used, partly due to technology transfer agreement which accompanied, and was built with the Italian company Italmipianti. Embalse nuclear plant became operational in 1984. In 2010, an agreement for the renewal of the plant was signed and it extended its life by 25 years. It is currently running about 80 % of its capacity to limit the damage of neutrons in the pressure tubes. This plant produces 648 MW for the Argentine electrical system.

In 1979 a third nuclear screened in Argentina following a decision by the Argentine government to have more than four units become operational between 1987 and 1997. It was a Siemens design. Construction began in 1981. However, the work proceeded slowly due to lack of funds and suspended in 1994 with 81 % of the plant built. In October 2006 the project began again as part of Argentine Nuclear Plan. In September 2011, President Cristina Fernandez de Kirchner inaugurated Atucha II Nuclear Plant, but it will not begin running until April 2014. This was announced by Presidential Chief of Staff Jorge Capitanich and Minister of Federal Planning Julio De Vido, on December 28<sup>th</sup> 2013. Once, Atucha II begins to work it will add 745 MW to the Argentine electrical system for 3 million people.

In February 2010, the government signed an agreement with Russia's Rosatom to share technical information related to the construction of nuclear power plants and look at possibly using Russian technology in the country. In April 2010, a nuclear cooperation agreement was signed with Russia, and in September 2010, another was signed with South Korea. In May 2011 Rosatom and the Argentine planning & investments minister said they were discussing the possibility of joint development and construction of a 640 MW reactor of unspecified type. In June 2012 the government signed a nuclear cooperation agreement with China, involving studies for a fourth nuclear power plant, financed by China, and a transfer of fuel fabrication and other technology. The government said that it could open the way for CNNC to be involved in building new plants.

Another aspect of the 2006 plan was to build a 27 MW prototype of the CAREM (Central Argentina de Elementos Modulares) reactor, and site works are now complete at Lima, next to Atucha. Authorization for site use and construction was received by CNEA from ARN in September 2013. INVAP is building it. Some 70% of components will be local manufacture. The ARS 298 million (\$64 million) contract for the 200-ton reactor pressure vessel was signed in December 2013 with IMP SA, making it the first such large component to be made in the country. Originally, the electromechanical installation was due in the first half of 2013 and fuel loading then grid connection in 2016, but this schedule has evidently slipped.

Developed by CNEA with INVAP and others since 1984, the CAREM-25 nuclear reactor is a modular 100 MWt simplified pressurized water reactor with integral steam generators, designed to be used for

electricity generation (27 MW gross, 25 MW net) or as a research reactor or for water desalination. Recent studies have explored scaling it up to 300 MW. CAREM has its entire primary coolant system within the reactor pressure vessel (11m high, 3.5 m diameter), self-pressurized and relying entirely on convection. Fuel is standard 3.4% enriched PWR fuel, with burnable poison, and it is refueled annually.

The prototype (listed by IAEA as a research reactor) will be followed by a larger version, possibly 200 MW, in the northern Formosa province by 2021. The site for this is reported as Colony Bouvier, 30 km south of Clorinda, and opposite the city of San Antonio on the Paraguay River, the national border. Paraguay has expressed concern about the project.

Argentine uranium resources listed total only about 15,000 tU, though the CNEA estimates that there is some 55,000 tU as "exploration targets" in several different geological environments. Uranium exploration and a little mining were carried out from the mid-1950s, but the last mine closed in 1997 for economic reasons. Cumulative national production until then from open pit and heap leaching at seven mines was 2509 tU.

However, there are plans to reopen the CNEA Sierra Pintada mine in Mendoza in the central west, which was closed in 1997. It is also known as the San Rafael mine and mill. Reserves there and at Cerro Solo in the south total less than 8000 tU. A resumption of uranium mining was part of the 2006 plan, in order to make the country self-sufficient.

In 2007, CNEA reached agreement with the Salta provincial government in the north of the country to reopen the Don Otto uranium mine, which operated intermittently from 1963 to 1981. Block leaching is envisaged.

#### **Argentine Nuclear Plan 2006:**

The 2006 Argentine nuclear reactivation plan is a project to renew and reactivate the development of nuclear power in Argentina. The main points of the plan were announced by the Argentine government through Planning Minister Julio de Vido during a press conference on 23 August 2006. They include:

- Finishing the incomplete Atucha II Nuclear Power Plant, this was started in 1980, by 2011. Atucha II is scheduled to start up in 2014.
- Researching the feasibility of the construction of a new nuclear plant, the fourth in Argentina.
- Extending the operational life of the Embalse power plant originally projected to end in 2011.
- Resuming the domestic production of enriched uranium.
- Working on a prototype CAREM, currently under construction.



## **RENEWABLE ENERGY**

In Argentina renewable energy is one of the most important options for energy generation, with this it is aimed to diversify the energy matrix and be less dependent on hydrocarbons.

The renewable energy sector may be divided in: Biodiesel Industry, Bio-ethanol Industry, Biogas, Eolic Generation, Solar Energy, Hydraulic and Ocean waves energy.

### **1) Biodiesel Industry:**

Argentina's biodiesel capacity is of approximately 10% of the global production and it is positioned as one of the first exporters in the world. A key part of the Argentine strategy has been to base their leadership on soy oil, the primary source of its local production of biodiesel. Argentine exports reached 1.624.987 ton in the year 2011.

Biodiesel development began in Argentina in 1997 with a group of entrepreneurs that began to study the possibility of making it.

In 2001 in Pilar, Buenos Aires province, Grutal S.A., the first biodiesel elaboration plant was installed and in June the same year was put into operation the first supplier selling biodiesel B-100 (100% biodiesel) in South America in the Cooperative Galarza (Entre Rios Province), achieving in three months to sale B-100 in Entre Rios, cheaper than gasoil at that time. At the same time the INTA begins with a series of studies, practices and informative campaigns oriented to the Agricultural sector demonstrating the behavior and yields of this unknown fuel. This first stage was characterized for the development of small and medium plants.

In 2002 due to the end of convertibility period (the convertibility period in Argentina is known as the period when one peso was equal to one dollar and it lasted from 1991 to the beginning of 2002) and the change of relative prices between soy and petroleum, biodiesel stopped being competitive. However biodiesel began to be one of the axes of national development for its added value, potential for developing regional economies and the possibility of reducing the deficit of liquid fuels, strengthening the energy balance. One of the main characteristics of this industry is its exporter structure since it destines 90% of its production to exports while only the remaining 10% is consumed domestically. Its plants are of great scale and with new generation technology.

In a little over a decade, the planted area as well as the obtained production presented an important growth, estimated and 122% and 152% respectively.

In 2007, Law 26.093 is enforced establishing a framework for regulating and promoting the use and sustainable production of biofuels that has the following benefits:

1. A mandatory percentage of diesels with biodiesel, stipulated in 8%, being able to increase it to 10%.
2. Assigned and ensured quotas for SMEs producing biodiesel.
3. Regulated prices of the product by the Ministry of Economy, Secretariat of Trade and Energy.
4. Prioritization of SMEs and agricultural producers.
5. Fiscal benefits for production and investment.

From the enforcement of this Law, biodiesel based on soy began to be representative. Between the years 2007 and 2010 its production quadrupled, going from 560.000 tons to 4.200.000 tons.

The strong momentum evidenced by this sector is explained on the one hand by increasing foreign demand especially of the European Union until 2012, where it is reduced considerably after the renationalization of Repsol and in 2013 when the EU puts an import tax from June, 2013 of between 57 and 104 Euros per ton, depending on the exporter.

The installed capacity of biofuels sector in Argentina is of 4.2 millions tons per year, and it can all be exportable.

Another National initiative in Argentina is to promote the use of biodiesel was the bid made by ENARSA to generate electricity using this fuel and other renewable energies in 2009 which they called GENREN. This time stakeholders were invited to provide a price per MWh generated from biodiesel and a price per MW of power available. The bidder should be bound to build a plant and ENARSA, to pay for the power available and buy 50% of the energy produced with biodiesel, the rest of the time the plant could dispatch energy generated with other sources and send it to the SPOT market for 15 years.

## **2) Bio-ethanol Industry:**

Until 2012, 100% of bioethanol produced in Argentina came from sugar cane. Its production was concentrated in the NOA (Tucuman 70%, Salta and Jujuy 30%), and its main destination was to supply the food and beverage, cosmetics, and agrochemical industries. The production of ethyl alcohol obtained from sugar cane was of 310.000 m3 during the harvest 2011/2012, of which 195.000 m3 were sent as anhydrous to cut in gasoline of the local market.

The quota granted by the Secretary of Energy of bioethanol to be mixed with gasoil since July 2010 was distributed among nine sugar companies (Compañía Bionergia Santa Rosa S.A., Bioenergia la Corona S.A., Alconoa S.R.L., Biotrinidad, Compañía Bionergetica La Florida S.A.; Rio Grande Energia S.A., Bioledesma S.A., Bio San Isidro S.A., Energias Ecologicas de Tucuman S.A.).

With the objective of supplying the local market with what is regulated by Law 26.093, in August 2012 ethanol made of corn and sorghum began to enter the market. Currently there are two plants working and dispatching to the National Bioethanol Plan, three plants that should be running in this year and six companies who were assigned quotas but haven't begun to construction.

## **3) Biogas:**

Biogas is a combustible gas, the product of the anaerobic digestion of organic materials generated through the activity of a group of bacteria, including methanogens. Anaerobic conditions occur only in the absence of oxygen.

Biogas may be obtained by:

- Municipal solid waste, called MSW are those that are generated from activities in urban centers or in their areas of influence composed organic matter in addition to paper and paperboard such as newspapers, magazines, boxes and packaging. Plastics used as bottles, bags, packaging, disposable cups and cutlery. As well as glass, bottles, jars, broken plates and also metals like cans and containers. The treatment of the organic fraction of municipal solid waste (MSW) can be performed through Wet digestion or Dry Digestion.
- Sewage waste, by treating the Sewage liquids.
- Waste: from farms, feedlots, piggery, and poultry farming.
- Agro-industrial waste.
- Energetic crops.

Currently in Argentina there are approximately 30 projects of varied technologies, scales, sources and destination of the energy.

An example of these projects is the "Central Buen Ayre". A project for electrical and thermal energy through biogas made of Municipal solid waste (MSW) by the C module of the Complejo Ambiental Norte III.

The project included the installation of an extraction system and capitation of biogas from the module, as also the electric transmission of 7.2 km and 13.2 kV to the SADI. This project provides effective renewable energy for 10MW to the National Network.

#### **4) Biomass:**

The use of solid biomass in Argentina has grown steadily in the last years. As example we can quote in Misiones Province the use of residue from the harvest and forestry processing to generate a great scale of vapor and electrical energy. The estimated annual consumption is of 900.000 tons and the capacity generated is of 78 megawatts.

#### **5) Eolic Energy:**

Argentina has exceptional characteristics regarding eolic resources. The country has nearly 70% of its territory covered with winds which average speed to 80 meters high is over 6m/s, while in the Patagonia region they can exceed 9 m/s.

Eolic generation in Argentina today has a very small participation in the primary energy sector of barely 0.3%. However, because of the quality of the resource and its competitive advantages, it presents itself as prosperous industry capable of changing the Argentine primary energy sector.

By the end of 2012, Argentina had 142.5 MW of eolic power installed. Of this total, 109.2 MW were connected to the SADI (Argentine System of Interconnection) and the rest is mainly composed by smaller eolic parks operated by electrical cooperatives where the generated energy is consumed inside their own local network. In July 2013 began the commercial test on the Eolic Park Loma Blanca IV of 51 MW in the province of Chubut. From July 21<sup>st</sup> 2013 the total installed eolic power in Argentina reached the 193.5 MW.

#### **6) Solar Energy:**

Argentina counts with a great availability of areas with great values of solar radiation per unit surface. Even though the use of this resource can be done all over the country, its best economic results can be found in the north of the country. With values superior to 2000 hs/year in many regions of the NOA with a lot less installed peak power can be obtained a larger energy generation the European average.

#### **Law 26.930:**

The law 26.930 was sanctioned in 2006 and is divided in two chapters; chapter 1 establishes a regulation regime for production for a period of 15 years, which can be extended by the President. Chapter 2 establishes a promotion regime.

##### Chapter 1:

The law doesn't declare which will be the organism that has authority of application, but its Regulatory Decree does, being the Secretary of Energy (dependant of the Ministry of Federal Planning) except with respect to tax matters, being in this case the Ministry of Economy and Production.

Law 26.093 establishes a mandatory mixture of biofuels with fossil fuels, with an added of biodiesel and bioethanol of 8% in gasoil and naphtha. (On December 2013, the Minister of Federal Planning announced that the mandatory added would go from 8% to 10% from January 1<sup>st</sup> 2014. This obligation will also be for thermoelectric plants.)

The Regulatory Decree also mentions the commercialization of biofuels on by promoted companies, which will be done on prices fixed by the Application Authority. Prices should be fixed taking in consideration a rational and prudent operation, assuring that producers of biofuels may cover all their costs and obtain a reasonable utility.

## Chapter 2

### Promotional Regime:

All biofuel industry projects will have the benefits of Law 26.093 as long as they:

1. Are installed in Argentine National Territory.
2. Are owned by commercial societies, private, public or mixed, or cooperatives, constituted in Argentina and habilitated exclusively for the development of biofuels, being able to be integrating all or some of the industrial stages necessary for the production of the concerned renewable raw materials.
3. Its majority capital is contributed by the National State, the Autonomous City of Buenos Aires, Provincial States, Municipalities or natural or legal persons, dedicated mainly to the agricultural production, according to the criteria established by the Regulatory Decree of this Law.

Article 14 of Law 26.093 establishes that small and medium companies; agricultural producers and regional economies will be prioritized.

### Promotional Benefits:

The promotional benefits established are:

1. Regarding VAT and Earnings Tax, Article 20 of the Regulatory Decree states that subjects of approved projects may obtain the anticipated return of VAT in depreciable assets (except for cars) and infrastructure works (except for civil works); or in Earnings Tax the accelerated amortization, not being able to access both treatments for the same project.
2. Assets allocated to projects approved by the enforcement authority, will not be part of the tax base of the tax on minimum presumed income, from the date of approval of the respective project and until the third year included, after the start of it.
3. Biodiesel and bioethanol produced by holders subjects of projects approved by the enforcement authority, to satisfy quantities foreseen in articles 7, 8 and 12 of the Law, will not be reached by the Rate of Hydraulic Infrastructure, established by Decree No. 1381/01, by the Tax on Liquid Fuels and Natural Gas established by Law 23.966.

The Secretariat of Environment and Sustainable Development (Secretaria de Ambiente y Desarrollos Sustentable) will act mainly advising on the benefits.

## ELECTRICITY

The Electricity Regulatory Framework Law (N°24.065/92) created the National Electricity Regulatory Commission (ENRE) as an independent entity that works within the scope of the Secretariat of State for Energy, responsible for drawing up the regulations governing the electricity industry and for ensuring compliance. ENRE was subsequently commissioned by the Secretariat of State for Energy (Decree 570/96) to administer concession contracts.

The Argentine electricity sector consists of four main groups: generation, transmission, distribution and large consumer companies.

### 1) Installed Power (Generation):

Generators are companies with electricity generating plants that sell output either partially or wholly through the NIS. Generators are subjected to the scheduling and dispatch rules set out in the regulations and managed by CAMMESA. Privately owned generators may also enter into direct contracts with distributors or large users.

The equipment installed in the Argentine Interconnection System (SADI Sistema Argentino de Interconexión), can be classified into three types according to the natural resource and the technology they use: fossil Thermal (TER), Nuclear (NU) or Hydraulic (HID). Thermals run on fossil fuel can be divided into four types of technology according to the type of thermal cycle used to harness energy: Steam Turbine (TV), Turbine Gas (TG), Combined Cycle (CC) and Diesel Engine (DI).

The country has other generation technologies that are connecting to the SADI progressively as wind energy (EOL) and photovoltaic (SOL), even though the latter has a low incidence in terms of installed capacity.

As of December 31, 2012, Argentina's installed power capacity was 31,056 MW. Of this amount, 61% was derived from thermal generation, 36% from hydraulic generation and 3% from nuclear generation, provided by 30 private companies using conventional thermal equipment and hydraulic generation technology, 2 bi-national companies using hydraulic generation technology and 10 national and provincial companies using nuclear generation technology.

The distribution of power in Argentina is controlled by 8 regions: Cuyo (Mendoza, San Luis, San Juan Provinces); Comahue (Neuquen, Rio Negro Provinces); NOA (Jujuy, Salta, Tucuman, Catamarca, La Rioja, Santiago del Estero Provinces); Centro (Cordoba, Entre Rios, Santa Fe Provinces); Litoral (Santa Fe, Entre Rios Provinces); GBA (Greater Buenos Aires, Buenos Aires City); BAS (Buenos Aires Province); NEA (Formosa, Chaco, Corrientes, Misiones Provinces); Patagonia (Chubut, Santa Cruz, Tierra de Fuego Provinces).

**Table 11: Installed power by region and type of generation as of 31 of December 2012 – MW**

<i>Region</i>	<i>Steam Turbine</i>	<i>Gas Turbine</i>	<i>Combined Cycle</i>	<i>Diesel Motor</i>	<i>THERMAL</i>	<i>Nuclear</i>	<i>Solar</i>	<i>Wind</i>	<i>Hydraulic</i>	<i>TOTAL</i>
CUYO	120	90	374	0	584	0	6	0	1069	1659
COM	0	202	1283	73	1558	0	0	0	4681	6238
NOA	261	1038	829	257	2386	0	0	25	217	2628
CENTRO	200	527	547	64	1338	648	0	0	918	2903
GBA-LIT-BAS	3870	1996	5984	396	12246	357	0	0	945	13548
NEA	0	59	0	242	301	0	0	0	2800	3101
PATA	0	160	188	25	373	0	0	86	519	978
TOTAL	4451	4071	9205	1057	18785	1005	6	112	11148	31056
Thermal%	24%	22%	49%	6%	100%					
TOTAL%					60%	3%	0%	0%	36%	100%

Source: CAMMESA annual report

**Table 12: Generating companies**

Company	Steam Turbine	Gas Turbine	Combine Cycle	Diesel Engine	Total Thermal Generation	Total Nuclear Generation	Total Solar Generation	Total Wind Generation	Total Hydro Generation	Total	%
All Amounts are in MW (except percentages)											
Yacyreta	-	-	-	-	-	-	-	-	2.745	2.745	8.8%
Costanera	1.131	-	851	-	1.982	-	-	-	-	1.982	6.4%
Piedra D Aguila	-	-	-	-	-	-	-	-	1.400	1.400	4.5%
Chocon	-	-	-	-	-	-	-	-	1.260	1.260	4.1%
Nuevo Puerto	390	-	798	-	1.188	-	-	-	-	1.188	3.8%
Alicura	-	-	-	-	-	-	-	-	1.050	1.050	3.4%
S. Grande Argentina	-	-	-	-	-	-	-	-	945	945	3.0%
Dock Sud	-	72	798	-	870	-	-	-	-	870	2.8%
CT Timbues (GSMA)	-	-	849	-	849	-	-	-	-	849	2.7%
Gral. Belgrano	-	-	848	-	848	-	-	-	-	848	2.7%
AES . Parana	-	-	845	-	845	-	-	-	-	845	2.7%
C.T. Genelba	-	165	674	-	838	-	-	-	-	838	2.7%
Rio Grande	-	-	-	-	-	-	-	-	750	750	2.4%
Pilar	200	-	479	-	679	-	-	-	-	679	2.2%
San Nicolas	600	75	-	-	675	-	-	-	-	675	2.2%
Aguas del Cajon	-	-	662	-	662	-	-	-	-	662	2.1%
Embalse	-	-	-	-	-	648	-	-	-	648	2.1%
Piedra Buena	620	-	-	-	620	-	-	-	-	620	2.0%
Puerto Nuevo	589	-	-	-	589	-	-	-	-	589	1.9%
Ense. Barragan	-	567	-	-	567	-	-	-	-	567	1.8%
Lomas de la Lata	540	-	-	-	540	-	-	-	-	540	1.7%
Lujan de Cuyo	120	46	374	-	540	-	-	-	-	540	1.7%
P. Banderita	-	-	-	-	-	-	-	-	472	472	1.5%
Futaleufu	-	-	-	-	-	-	-	-	472	472	1.5%
C.T. Tucuman	-	-	447	-	447	-	-	-	-	447	1.4%
Termoandes	-	416	-	-	416	-	-	-	-	416	1.3%
Diamante	-	-	-	-	-	-	-	-	388	388	1.2%
S.M. Tucuman	-	-	382	-	382	-	-	-	-	382	1.2%
Guemes	261	100	-	-	361	-	-	-	-	361	1.2%
Atucha	-	-	-	-	-	357	-	-	-	357	1.1%
Buenos Aires	-	-	322	-	322	-	-	-	-	322	1.0%

Company	Steam Turbine	Gas Turbine	Combine Cycle	Diesel Engine	Total Thermal Generation	Total Nuclear Generation	Total Solar Generation	Total Wind Generation	Total Hydro Generation	Total	%
All Amounts are in MW (except percentages)											
Pichi. P Leufu	-	-	-	-	-	-	-	-	285	285	0.9%
Brigadier Lopez	-	-	-	-	280	-	-	-	-	280	0.9%
Los Nihuales	-	-	-	-	-	-	-	-	265	265	0.9%
Maranzana	-	180	68	-	248	-	-	-	-	248	0.8%
Pluspetrol Norte	-	232	-	-	232	-	-	-	-	232	0.7%
Mobile Generation	-	-	-	220	220	-	-	-	-	220	0.7%
Sorrento	217	-	-	-	217	-	-	-	-	217	0.7%
Necochea	204	-	-	-	204	-	-	-	-	204	0.7%
Mar del Plata	56	121	-	-	177	-	-	-	-	177	0.6%
Co. Argener	-	163	-	-	163	-	-	-	-	163	0.5%
Termroca	-	130	-	-	130	-	-	-	-	130	0.4%
Independencia	-	130	-	-	130	-	-	-	-	130	0.4%
C.T. Patagonia	-	-	125	-	125	-	-	-	-	125	0.4%
Villa Gessel	-	125	-	-	125	-	-	-	-	125	0.4%
Caracoles	-	-	-	-	-	-	-	-	121	121	0.4%
Arroyito	-	-	-	-	-	-	-	-	120	120	0.4%
C.H. Cahueta	-	-	-	-	-	-	-	-	120	120	0.4%
Cabra Corral	-	-	-	-	-	-	-	-	101	101	0.3%
Sud Oeste	-	100	-	-	100	-	-	-	-	100	0.3%
Piquirenda	-	-	-	30	30	-	-	-	-	30	0.1%
Others	13	1.378	144	1.027	2.282	-	6	112	600	3.00	9.6%
<b>Total</b>	<b>4.401</b>	<b>3.999</b>	<b>9.205</b>	<b>1.277</b>	<b>18.883</b>	<b>1.005</b>	<b>6</b>	<b>112</b>	<b>11.094</b>	<b>31.100</b>	<b>100%</b>

Source: Pampa Energia

## 2) Transmitters:

Electricity is transmitted from power generation facilities to distributors through high voltage power transmission systems. Transmitters do not engage in purchases or sales of power. Transmission services are governed by the Regulatory Framework Law and related regulations promulgated by the Secretariat of Energy. In Argentina, transmission is carried at 500 kV, 220 kV and 132 kV through the national interconnection system. The national interconnection system consists primarily of overhead lines and sub-stations (i.e. assemblies of equipment through which electricity delivered by transmission circuits is passed and converted into voltages suitable for use by end users) and covers approximately 90% of the country.

### **3) Distributors:**

Each distributor supplies electricity to consumers and operates the related distribution network in a specified geographic area pursuant to a concession. Each concession establishes, among other things,

- the concession area,
- the quality of service required,
- the rates paid by consumers for service and
- an obligation to satisfy demand.

The ENRE monitors compliance of federal distributors, with the provisions of the respective concessions and with the Regulatory Framework Law, and provides a mechanism for public hearings at which complaints against distributors can be heard and resolved. In turn, provincial regulatory agencies monitor compliance by local distributors with their respective concessions and with local regulatory frameworks.

**4)** The wholesale electricity market classifies large users of energy into three categories: Major Large Users (Grandes Usuarios Mayores, or GUMAs), Minor Large Users (Grandes Usuarios Menores, or GUMEs) and Particular Large Users (Grandes Usuarios Particulares, or GUPAs). Each of these categories of users has different requirements with respect to purchases of their energy demand.



## **NATIONAL ENERGY PLAN (2004-2019)**

With the formulation and the implementation from the year 2004 of the National Energy Plan, the Ministry of Federal planning has managed investment strategies during the period 2004-2012, to expand and modernize energy infrastructure, for AR\$ 84.389 millions; investment destined to works that have been finished of which 75% correspond to public investment and the rest to mixed and private investments; adding additional investment for AR\$ 45.000 millions.

Of the AR\$ 84.389 millions corresponding to energy infrastructure developed and finished in the period 2004-2012, AR\$ 53.389 millions were destined to increase installed power of the generation park of the SADI (Argentine System of Interconnection), AR\$ 12.400 millions to increase the electricity transport system with extra high voltage lines (LEAT) in 500 KV and AR\$ 18.600 millions to expand the natural gas transport system through networks. The increase of installed power incorporated an additional 8.727 MW (49% more than 2003); the expansion of the SADI added 4.244 km. of LEAT in 500 kV (46.7% more than in 2003) and by expanding the transport capacity of natural gas through networks, with the construction of 2.353 km. of main gas pipeline, expanding the existing, empowering compressor plants, etc., added 27.3 millions cubic meters daily.

Among the main objectives of the National Energy Plan 2004-2019 is the need to diversify the energy matrix, with the object of decreasing the historical dependency of the national production sector on hydrocarbons, with strategic and nonrenewable resources. According to the a report of the National Secretary of Energy, for 2010 the total offer of primary energy of Argentina was composed in 88% by hydrocarbons (49.7% natural gas, 37.1% petroleum and 1.2% mineral carbon), 2.7% by nuclear energy and 9.4% by renewable sources of energy (4.3% water energy and 5.1% other sources). If all projects corresponding to new equipments for thermal-fossil energy generation, new dams of the Hydro Electrical Plan, new nuclear power plants, projects for eolic parks managed by ENARSA, etc., are finished. In the year 2017 hydrocarbons should participate with 83.4% of the national energy matrix and for the year 2024 hydrocarbons should participate in 75.3% of the energy matrix.

### **ENARSA**

ENARSA (Energía Argentina Sociedad Anonima . Argentine Energy Limited Company) was created on December 29<sup>th</sup> 2004 by the National Law 25.943 and regulated through Decree of the Presidential Power 1529/2004.

Its main objective is the exploration and exploitation of solid, liquid and gas hydrocarbons, transport storage, distribution, marketing and industrialization of these products and their derivates, as well as supplying the public service of transport and distribution of natural gas. It may generate, transport, distribution and sale of electricity and trading activities related to energy goods. These activities may be carried out by itself or through third parties associated with third parties both at home or in foreign countries.

The purpose of the company is to collaborate in the supply of energy to tend the growth needs of the country, for the welfare of its citizens; promote development of the national industry and generate value for shareholders.

ENARSA business areas are Electrical Energy, Natural Gas, Petroleum and Renewable Energy.

## **NEWS ON FOREIGN INVESTMENTS IN ENERGY SECTOR IN 2013**

### **China and Argentina Extend Nuclear Cooperation**

China and Argentina have extended their cooperation in the field of nuclear energy with the signing of two agreements covering operations and technology, as well as the use of Chinese goods and services in Argentine exports.

Both agreements were signed in Buenos Aires on 29 January 2013 by utility Nucleoeléctrica Argentina SA and China National Nuclear Corporation (CNNC) in the presence of Argentine federal planning minister Julio de Vido, Chinese ambassador Yin Hengmin and CNNC president Mao Xiaoming.

Under the first agreement, Nucleoeléctrica and CNNC will cooperate on issues related to reactor pressure tubes, including engineering, fabrication, operation and maintenance. It will also cover the manufacture and storage of nuclear fuel, licensing, life extension and technological advances. This agreement is aimed at both operating and future nuclear power plant projects.

The second agreement calls for the transfer of Chinese technology to Argentina. Under the accord, Argentina could act as a technology platform, supplying third countries with nuclear technology incorporating Chinese goods and services.

In addition, the CNNC delegation presented technical and financial aspects of its CAP-1000 reactor, which is one of several designs being considered for Argentina's fourth nuclear power reactor.

The signing of the two agreements follows a July 2012 nuclear cooperation accord between Argentina and China involving studies for a fourth nuclear power plant, financed by China, and in transfer of fuel fabrication and other technology.

### **Chevron and YPF Deal**

On 16 July 2013 US oil company Chevron signed an agreement with YPF to invest U\$S 1.24 billion in Vaca Muerta shale oil and gas formation.

This was the first major investment announced in Argentina's petroleum sector since President Cristina Kirchner ordered the seizure of YPF from Spain's Repsol in 2012.

The investment will allow the two companies to drill 100 wells in an area of 20 km<sup>2</sup>, according to statements from YPF and Chevron.

Companies that explore Vaca Muerta and export from the field will be allowed to keep their earnings in foreign exchange outside the South American country, a benefit denied to other companies that are required to repatriate their earnings.

The Neuquén legislature approved the agreement between YPF and Chevron to exploit Vaca Muerta shale gas reserves on August 28<sup>th</sup>, 2013.

According to related news on the deal, the 5 key facts are;

- Chevron brings shale gas experience and an initial investment of \$1.24bn dollars.
- President Fernández established a decree allowing energy companies . that invest over \$1bn dollars over a five-year, such as Chevron . to export, tax free, up to 20% of shale oil/gas they extract in the country.
- 100 wells in an area of 20 square kilometers (5,000 acres), known as Loma La Lata Norte and Loma Campaña will be initially drilled.
- Daily production is expected to reach 50,000 barrels of oil and 3 million cubic meters of gas by 2017.
- In the second phase, YPF and Chevron will be 50-50 partners aiming to drill 1,500 wells.

### **China Will Build and Finance Two Dams in Patagonia Equivalent to 10% of Argentine Power Demand**

In the second half of August, Argentina's government awarded a 4 billion dollars contract for the construction of two hydroelectric dams to a consortium led by China Gezhouba (Group) Co. and which includes Argentine firms Electroingenieria SA and Hidrocuyo SA.

The hydroelectric project is expected to generate 1,740 megawatts of electricity in the sparsely populated Patagonia province of Santa Cruz, which also happens to be the political turf of President Cristina Fernandez and her late husband Nestor Kirchner. The government says the dams will help curb Argentina's need to import diesel and liquefied natural gas and save some 1.1bn dollars a year.

### **Dow Chemical Signs Accord to Jointly Develop with YPF Patagonia Shale Gas**

It was announced on 25 September 2013 that Argentina's oil and gas YPF and Dow Chemical Co. Argentine unit signed a final accord to invest 188 million dollars to jointly develop shale gas at the country's Vaca Muerta formation, in the Patagonian province of Neuquen.

Dow will provide 120 million over a year while YPF will invest 68 million to develop 16 shale gas wells, the Buenos Aires-based company said in a statement on Tuesday. Dow, the largest US chemical producer by sales, is YPF's second shale partner after Chevron Corp.

### **Germany's Main Oil Company Signs to Operate in Development of Patagonia's Vaca Muerta Shale Deposits**

Germany's Wintershall sealed, on 25 September 2013, a 150 million dollar unconventional exploration contract with the Argentine province of Neuquén's owned Gas y Petroleo de Neuquén to search for oil in the Vaca Muerta formation. The agreement could later be extended to 3.35bn.

The companies will explore Aguada Federal, a 97-square-kilometre area in the Añelo municipality, according to provincial officials.

Each company will hold a 50% stake in the contract, although Wintershall, which is the oil and gas arm of chemicals group BASF, will be the operator in the search while GyP will remain the owner of the exploration and exploitation permit.

Wintershall will invest 150 million over a maximum of two years, of which 30 million will go directly to Gas y Petroleo de Neuquén. It will then spend some 120 million to drill two vertical and four horizontal wells.

If all goes well, and both companies agree, the agreement could later be extended to drilling some 120 wells in a factory-style development that would require an investment of some 3.35bn dollars over a period of ten years, the Patagonia provincial government said.

That would make the deal larger than the 1.24-billion agreement that state-majority controlled oil company YPF recently sealed with Chevron to drill some 130 wells in Vaca Muerta.

### **Argentine Oil Company Finds Way to Invest in Vaca Muerta and Elude Legal Action from Repsol**

On 3 October 2013 and one day after the Argentine government extended the deadline to legalize undeclared cash, energy company Bidas International gave new life to the BAADE energy bonds, by saying it would snap up 500 million dollars of the paper.

The move gives Bidas a way to invest in the Vaca Muerta formation without risking legal action from Spanish firm Repsol.

The investment will not be less than 500 million dollars and has the objective, among others, to invest on unconventional energy projects, the company said, adding that the move has nothing to do with the whitewash law since it is a foreign direct investment by foreign residents. By doing this Bidas confirms its investment process in Argentina, the company added.

### **Consortium Led by Total to Invest 1.2bn offshore Tierra del Fuego for Natural Gas**

On 24 October 2013, it was announced that France's Total will lead a 1.2 billion dollars project to produce natural gas off the coast of Tierra del Fuego in the extreme south Argentina. In partnership with Wintershall AG and Pan American Energy LLC, they will drill as deep as 5.5 kilometers in the Vega Pleyade field, according to Javier Rielo who heads the project. The venture, owned 37.5% each by Total and Wintershall and 25% by PAE, plans an initial investment of between 1 billion and 1.2 billion, which may rise to as much as 1.5 billion if more wells need to be drilled. PAE is owned 60% by BP, with the remainder in the hands of a venture between Bidas Corp. and China's Cnooc Ltd.

The partners plan to start producing at Vega Pleyade in the third quarter of 2015 at about 6 million cubic meters a day, ramping up to 10 million. The venture will also increase the Carina field production, which currently is 8 million cubic meters a day. Output is set to rise by 1.5 million meters cubic a day in 2014's second quarter.

Additionally, the venture secured new concessions in an area called Leo. Total, which will operate the fields, is Argentina's largest gas producer.

### **YPF and Repsol Reached an Agreement with Mexican Mediation**

The dispute between the Argentine government and Repsol over the seizure of a 51% stake in petroleum company YPF has been solved as the Ministry of Economy announcing on 25 November 2013, that an agreement in principle for compensating the Spanish corporation had been reached.

The understanding, which will need to be approved by Repsol's most senior governing bodies, will imply fixing a compensation figure and its payment with liquid assets, and that both parties will end their respective legal actions, according to the release.

On 27 November 2013, Spanish oil group Repsol's board backed a 5 billion-dollar compensation deal in Argentine government bonds over Argentina's 2012 seizure of the company's YPF subsidiary. The deal seeks to repair the financial hit taken by Repsol when Argentina's President Cristina Fernandez in April 2012 ordered the seizure of Repsol's 51-percent stake in YPF. The deal also stipulated the withdrawal of legal lawsuits filed against Argentina by Repsol over the YPF seizure.

According to the news, the dollar-denominated bonds would be secured by guarantees, and the company would face no requirements to reinvest any money in Argentina and no restriction on its ability to sell the bonds. The interest rate and other terms of the bonds were unclear. The Spanish oil company currently holds a 12% stake in YPF.

Furthermore, the sources expressed that in addition to the compensation, the exploitation rights of 6.4% of Vaca Muerta shale deposits will be given to the YPF-Repsol-Pemex partnership.

The chief of Mexican state oil monopoly Pemex, who has close ties with Argentina has expressed interest in exploiting Vaca Muerta.

The Repsol dispute was the single biggest problem facing the Argentine energy industry and an impediment to greater foreign investment, said Jorge Lapeña, a former YPF chairman and energy regulator.

"As long as this issue wasn't resolved and YPF had a legal problem on its hands it was going to be difficult to get outside funding and to sign joint ventures," he said. "Definitively resolving the problem with Repsol will make it easier for YPF to function as a company."

### **Visit to China, Moscow and Brazil for Attracting Investment**

Economy Minister, Axel Kicillof, and Minister of Public Infrastructure and Planning, Julio De Vido, paid an official visit to Moscow, China and Brazil in December 2013 and presented investment opportunities in 15 large infrastructural projects which will be put up for tender between the end of this month and the end of 2014.

The 15 projects require a combined investment of US\$19bn, according to the Argentine delegation which travelled to China. More than a quarter of this investment, around US\$5bn, would go towards a hydro-power programme to develop the Deseado river in Santa Cruz province. Investment for this project, which looks to use the waters from lake Buenos Aires-General Carrera in Patagonia to generate energy, will be put up for tender in November 2014.

In total, it is hoped that the ten hydroelectric projects proposed by the national government will generate 4,953 MW of power -around 20% of the current power in the network- and an annual electric production of 18,231 GW. The hydroelectric projects, which will largely begin towards the end of 2014, are part of the national plan to reduce the country's dependency on thermal energy. Thermal energy currently represents 64% of Argentina's fuel needs. This project looks to increase the percentage of hydroelectric energy to 31% and to 41% by 2025. According to the government these hydroelectric projects will save 4,333bn litres of fuel and US\$3,972bn annually.

One of the hydro projects planned looks to build sustainable infrastructure in the Formosa province to improve irrigation and supply to the province's 60,000 residents. The government also hopes to invest US\$440m in a dam using the water from the Dulce river to guarantee water supplies for residents in the southeast and the north of the Santiago del Estero province.

The final plan looks for investment to build a communications tower which will be built on the border between Avellaneda, in the province of Buenos Aires, and the city of Buenos Aires. This tower would become the sole radio and digital TV transmitter and would also become a feature of the city's skyline as, standing at 368m tall, would become one of the tallest structures in South America.

The first tender is open since the December 20 for potential investors.

**Bibliography:**

[http://www.edenor.com.ar/cms/EN/EMP/IR/SEC\\_participantes.html](http://www.edenor.com.ar/cms/EN/EMP/IR/SEC_participantes.html)

<http://portalweb.cammesa.com/MEMNet1/Documentos%20compartidos/VAnual12.pdf>

<http://portalweb.cammesa.com/Pages/Institucional/defaultinstitucional.aspx>

<http://www.gasnaturalfenosa.com.ar/ar/inicio/grandes+clientes/comercializadora/infraestructura+energetica/1297092366644/distribucion.html>

<http://www.cfee.gov.ar/>

<http://www.cab.cnea.gov.ar/ieds/>

[http://www.mecon.gov.ar/peconomica/docs/Complejo\\_Petroleo\\_y\\_Gas.pdf](http://www.mecon.gov.ar/peconomica/docs/Complejo_Petroleo_y_Gas.pdf)

[http://ri.pampaenergia.com/pampaenergia/web/conteudo\\_en.asp?idioma=1&conta=44&tipo=23467](http://ri.pampaenergia.com/pampaenergia/web/conteudo_en.asp?idioma=1&conta=44&tipo=23467)

[http://www.mecon.gov.ar/peconomica/docs/Complejo\\_Petroleo\\_y\\_Gas.pdf](http://www.mecon.gov.ar/peconomica/docs/Complejo_Petroleo_y_Gas.pdf)

[http://www.enargas.gov.ar/Publicaciones/Informes/Anual/2012/Cap\\_4.pdf](http://www.enargas.gov.ar/Publicaciones/Informes/Anual/2012/Cap_4.pdf)

[http://www.cienciayenergia.com/Contenido/pdf/140812\\_rad\\_arg.pdf](http://www.cienciayenergia.com/Contenido/pdf/140812_rad_arg.pdf)

<http://www.eeaoc.org.ar/upload/contenido/pdf/20120228122933000000.pdf>

<http://www.cader.org.ar/anuario/2013/sp/masrenovable2013.pdf>

<http://www.carbio.com.ar/es/?con=newsletter>

[http://www.tech4cdm.com/uploads/documentos/documentos\\_La\\_Solar\\_Termica\\_en\\_Argentina\\_33ef819f.pdf](http://www.tech4cdm.com/uploads/documentos/documentos_La_Solar_Termica_en_Argentina_33ef819f.pdf)

<http://biodiesel.com.ar/tag/ley-26093>

<http://inta.gob.ar/documentos/ley-26.093-y-su-decreto-reglamentario-biocombustibles>

<http://www.cronista.com/economiapolitica/Decreto-9292013-Regimen-de-Promocion-de-Inversion-para-la-Explotacion-de-Hidrocarburos.-20130715-0060.html>

[http://www.buenosairesherald.com/article/136198/chevron--ypf-sign-\\$124-billion-vaca-muerta-shale-deal](http://www.buenosairesherald.com/article/136198/chevron--ypf-sign-$124-billion-vaca-muerta-shale-deal)

[http://www.world-nuclear-news.org/NP-China\\_Argentina\\_extend\\_cooperation-0402134.html](http://www.world-nuclear-news.org/NP-China_Argentina_extend_cooperation-0402134.html)

<http://www.enarsa.com.ar>

<http://www.telam.com.ar/notas/201312/45396-de-vido-presento-proyectos-energeticos-y-desperto-el-interes-de-los-principales-grupos-construtores-brasilenos.html>

<http://www.cnea.gov.ar/notinuc/descripcion-noticia?nid=177>

<http://tiempo.infonews.com/2013/06/15/argentina-103776-acuerdo-decisivo-entre-ypf-y-pdvsa.php>

<http://www.world-nuclear.org/>

<http://www.cnea.gov.ar/>