



STATE OF THE ARGENTINE BIOFUELS INDUSTRY

Launching of the Domestic Biodiesel and Ethanol Market

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Este documento también está disponible en castellano bajo el título, *Estado de la industria argentina de biocombustibles: Comienza el mercado nacional de biodiesel y etanol*, en www.argentinarenovables.org.

Highlights

- A number of studies have amply demonstrated that subsidization of fossil fuel prices, as occurs in Argentina, is counterproductive and result in less investment (page 4);
- The domestic market for ethanol is comprised of nine companies in NW Argentina, all of whom use sugarcane as feedstock (page 7);
- As installed capacity grows according to a very specific monthly program, Argentina will end 2010 with an overall ethanol blending that is very close to the mandated E5 (page 11);
- The domestic ethanol market will generate the equivalent of some US\$200 million a year; due to the slow start in 2010, it will only reach about US\$150 million this year (page 13);
- The domestic market for biodiesel is comprised of nineteen companies, all using soy oil as feedstock except for one that operates on used cooking oil (page 14);
- The small and medium size biodiesel producers successfully managed to have the entirety of their capacity assigned to the domestic market and represent fully 44% of the total (page 17), allowing the larger producers to continue to focus on export markets;
- The B5 mandate represents annual sales of about US\$770 million. Should this be expanded to a B7 in 2011 as promoted by CADER, it will grow to one billion dollars per annum; and if a B10 mandate is enacted in 2012 it will become a US\$1.5 billion market (page 19);
- A map on page 23 shows the geographical distribution of biofuels plants as well as the location of the oil companies' blending terminals.

Introduction

The Argentine Renewable Energies Chamber (*Cámara Argentina de Energías Renovables*, or CADER) periodically analyzes various aspects of this nascent industry, publishing studies and essays. These are typically part of a “State of the Industry” series. This particular study is the seventh in the *State of the Argentine Biofuels Industry* series.

1. In ***Outlook for the Argentine Biodiesel Industry***, published in October 2008, we presented the first analysis, showing a complete picture of the industry.
2. In April 2009 we published ***The State of the Argentine Biodiesel Industry: First Quarter 2009 Report***, reporting on how the industry concluded 2008 – a significant year -- and discussed trends and events such as emerging trade conflicts with the European Union, as well as our ideas for an improved legal and regulatory framework that would help advance the beginning of the domestic mandates in 2010. As will be seen here, many of these suggestions have been implemented by the government.
3. The essay ***La Argentina y los biocombustibles de segunda y tercera generación***, published in July 2009 in Spanish only, covered the issue of a rapidly evolving industry working towards second generation (i.e., comprised of non-edible feedstock) solutions and the third (technologically-driven new conversion technologies), and how this evolution might affect the Argentine industry which has a very strong competitive advantage in first generation feedstocks (i.e., edible feedstock such as soy).
4. This was followed by ***Biofuels Policy in Argentina***, published in August 2009, explaining the nuances of the existing legal framework as currently written, which included a description of the ethanol price determination mechanisms.
5. With ***The State of the Argentine Biodiesel Industry: First Semester 2009 Report***, published in September 2009, we produced the first complete global ranking of biodiesel production by country, showing that Argentina was fifth; announced that the domestic mandate would be delayed, and described the industry as comprised of three separate “castes”, outlining the similarities and differences of each.
6. ***Argentine-European Biodiesel Trade: Proposals for the transparent development of an industry***, published in January 2010, outlined the emerging trade dispute, clarifying misunderstandings and some unfounded accusations, and sought to mollify the situation with specific proposals.
7. Here we present ***The State of the Argentine Biofuels Industry: Launching of the Domestic Biodiesel and Ethanol Market***, where we outline the beginning of the B5 and E5 mandates.

All of these documents can be found free of charge on CADER’s website, on the Essays & Studies page: http://www.argentinarenovables.org/ingles/informes_estudios_ensayos.php.



We will also soon be publishing a complementary study, tentatively entitled, ***Biofuels Policies around the World: Explaining the Unexplainable***. This study will analyze why some countries have had greater success in developing their biofuels industries (among them, France, Portugal, Malaysia, Brazil and Argentina) and why others have not (notably, the United States, Germany, Spain and Australia), which may be useful to legislators seeking to understand what policy tools are available to them and the effect of their application in different combinations.

The intent of these documents is to offer the national public and industry a very basic understanding of the workings of the Argentine industry, with its successes and challenges, as well as to promote its potential in a fair and balanced manner. CADER also publishes these studies to generate debate within Argentina about an important component of the country's energy future: a well informed citizenry is in a better position to make wise decisions regarding its future.

The Damaging Effects of Subsidizing Fossil Fuels

Argentina's continued economic growth coupled with its rapidly diminishing fossil fuel reserves necessitate the creation of new energy sources, especially renewable energy, given the country's extraordinary natural resources. This helps explain the government's recent "GENREN" (loosely, Generation of Renewables) tenders for more than 1000 MW coming from such sources as wind, solar, and biomass, for example. However, realization of these wind farms and solar stations is contingent on financing, which is currently in short supply in the country.

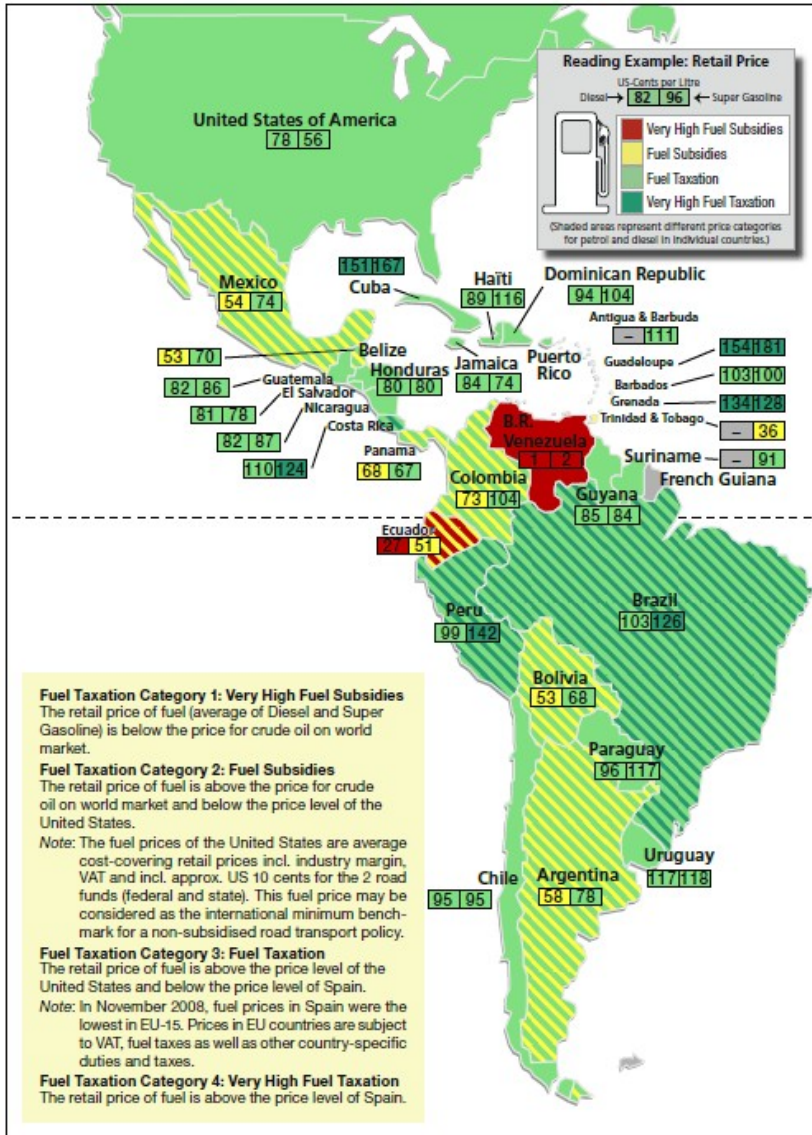
And yet there is no shortage of capital available or desire to invest: in 2008 the renewable energy industry invested \$12 billion dollars in Latin America – although \$10 of the \$12 billion was all invested in Brazil, and primarily in ethanol plants. Argentina is capable of attracting for more investment than it has in recent years.

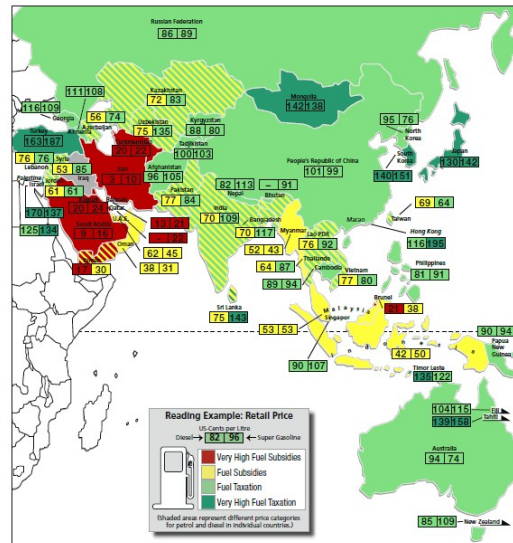
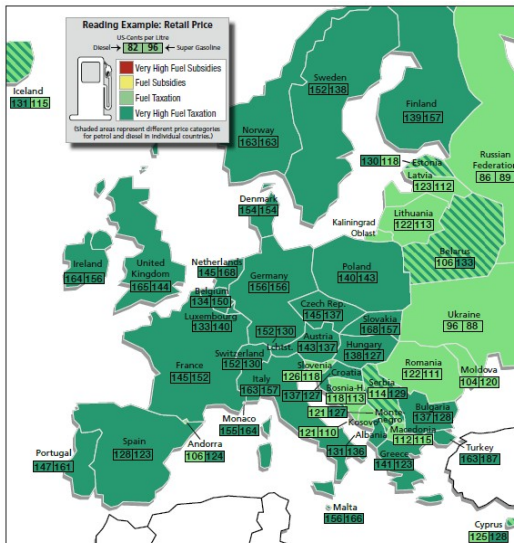
However, ours is a nation that subsidizes energy at the pump as well as the socket. A recent German study¹ published in December 2009 shows clearly on maps the comparative situation in fossil fuel tax treatment (see Graph 1, next two pages). Oil-rich countries tend to subsidize fuels; Europe taxes them heavily. Argentina tends towards subsidization, and alas, has not been getting much energy investment in recent years.

Not only that, most energy consumption growth occurs in emerging economies such as Argentina's. While in the 1960s and '70s economic growth – and energy consumption – was driven by mature high-income countries, it is driven by emerging economies in the 21st century. And the rising influence of these countries is disproportionate in energy markets because they tend to be less efficient in their use of energy. Energy intensity (the energy needed to produce one unit of GDP) is three times as great in the developing world as in the developed. Something will have to give: either energy efficiency increases or emerging market economies will slow down. Here we have another solid argument for the development of renewable energies in Argentina.

¹ *International Fuel Prices 2009*, Sixth edition, GTZ. See complete study at: www.gtz.de/en/themen/29957.htm

Graph 1: A comparison of worldwide fossil fuel prices and their subsidization/taxation





Continuing the analysis begun by British Petroleum’s chief economist:²

The shift of energy demand to developing countries is a major change. At market exchange rates, the average per capita income of non-OECD economies is \$2,300, compared with \$32,000 in the OECD countries. What is more, it takes 3.4 barrels of oil equivalent to produce \$1,000 worth of GDP in the non-OECD countries, versus 1.1 barrels of oil equivalent in the OECD countries. Developing countries are energy intensive partly because of various inefficiencies, particularly the widespread subsidization of energy. (*emphasis added*)

Historical Background: Biofuels in Argentina

Economic activity is largely regulated in Argentina. As will be seen in broad strokes in this study, biofuel plants can only operate after the federal government has formally authorized them to do so. In addition, it determines biofuel mandates, and determined which companies were allowed to sell product into the domestic market for the mandates that began this year. Furthermore, they also establish the price at which biofuels are sold to blenders. This system is generally accepted by the private sector, although it lacks transparency and results in a paternalistic system. The paradox is that Argentina has one of the more successful biofuels industries in the world.

In May 2006 Argentine Biofuels Law #26.093 was enacted. Its focus was the development of a domestic biofuels market, and it established a B5 and E5 requirement beginning January 1st, 2010. However, a global biofuels industry had already been launched by the time the law came out, and many large

² *Global Energy After the Crisis*, Christof Rühl, Foreign Affairs, March-April 2010



consumers such as Europe and the United States had already established ambitious targets. The Argentine private sector, led by the large oilseed crushers, saw a market opportunity and was among the first to build large biodiesel plants, typically using foreign technology, and focusing on export markets – which ended up being primarily in Europe. Argentina is, in fact, only one of two countries that developed their export markets ahead of their domestic ones; the other is Malaysia. Both were driven by an abundance of feedstock, comparatively smaller domestic markets, and a desire to generate hard currency through exports.

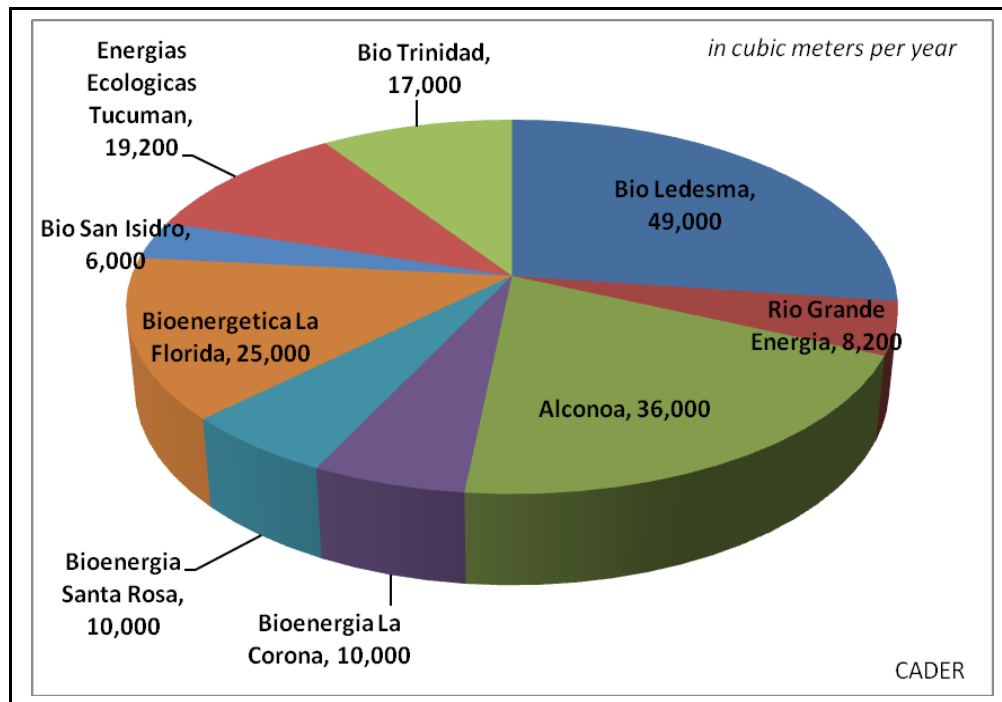
The Legislative Branch’s biofuels law was the “what”; the Executive Branch of government was responsible for its regulation -- the “how”. These were slow to come out. Law 26.093 wasn’t regulated until late 2007 by Resolution 109/07, but by then a number of biodiesel plants were already operating. Also, the Resolution that deals with plant safety requirements, for example, wasn’t published until late 2008, when the Argentine industry was already a powerhouse and caused a flurry of petitions for exceptions and additional expenditures to the industry. These rulings, along with Resolutions 226/08; 1296/08; 6/10 and 7/10 constitute the framework of the biodiesel industry today.

Meanwhile, the sugarcane industry successfully lobbied for the establishment of its own Bioethanol Promotional Law #26.334 in early 2008, which grandfathers to all existing sugar producers, and also allows any new companies that want to participate in the ethanol industry -- as long as a controlling interest is held by Argentine nationals. This law, together with Resolutions 1293/08; 1294/08; 1295/08; 1296/08; 689/09; 733/09 and 3/10 constitute the framework of the ethanol industry today.

The oil & gas industry is necessarily also a stakeholder in the industry’s value chain, as they are required to buy ethanol and biodiesel at a price established by the government. They bear the cost of picking up the biofuel and blending at their designated terminals across the country. The oil industry has also been required to invest millions of dollars in the setting up their links within the biofuels industry.

ETHANOL

Graph 2: Companies assigned to supply the domestic ethanol market in 2010



Source: Resolution 698/2009 from Secretaría de Energía

Ethanol is produced from sugar or starchy crops such as corn (primarily in the U.S.), wheat (Canada and Europe), beet (Europe), but most efficiently from sugarcane, as in the case of Brazil and now also Argentina. Globally, there are a number of ethanol blends with fossil fuels with designations such as E5; E85; E100; ED95%; E-diesel; and many more. In Argentina the government mandate is for anhydrous ethanol, all of which is worth describing, however briefly.

Chemically, all alcohols are identical, irrespective of how they are produced. **Hydrous bioethanol** means water-containing ethanol (usually 2-7% water). This ethanol is used in neat ethanol engines (i.e., adapted to use 100% ethanol). **Anhydrous bioethanol** is the product remaining when hydrous ethanol is dehydrated, enabling it to be mixed in low blends with gasoline and diesel. This contains very small volumes of water – in Brazil a maximum water content of 0.7% is allowed; in Argentina, it is 0.5% as per Resolution 1295/08. This is the ethanol used in E85.

A high blend such as E85 (85% anhydrous ethanol with 15% fossil fuel) requires vehicles known as flexfuel (FFV) and require dedicated fuelling infrastructure. Low blends such as E5 (5% anhydrous ethanol with 95% fossil fuel) can be used in existing traditional vehicles.

Legal and Regulatory Framework for Ethanol

- Law 26.093/06:** Biofuels law. Biodiesel and ethanol mandates. Participating enterprises. Application Authority.
- Decree 109/07:** Regulations for Biofuels Law.
- Law 26.334/08:** Promotional law for ethanol.
- Resolution 266/08:** Registry of universities authorized to perform technical, environmental, and safety audits on biofuels plants.
- Resolution 1293/08:** Mechanism for the selection and approval of ethanol production projects.
- Resolution 1294/08:** Procedure and formula to determine the wholesale price of ethanol.
- Resolution 1295/08:** Quality specifications for ethanol.
- Resolution 1296/08:** Fire safety requirements for biofuels plants.
- Resolution 698/09:** Determination of the companies that are allowed to sell ethanol and their required volumes for 2010.
- Resolution 733/09:** Establishes monthly capacity additions committed to by companies participating in the ethanol mandate.
- Resolution 3/10:** Correction to Resolution 733/09.

Texts for each of the above legal framework can be found on CADER's website at www.argentinarenovables.org/leyes.php, unfortunately, in Spanish only.

In September 2009 Resolution 698 was published, which establishes the companies participating in the domestic ethanol market as well as each company's production commitment. However, the total reached only 180,400 cubic meters (equivalent to 180.4 million liters, or 47.7 million gallons), while the E5 mandate is estimated to be about 282,000 cubic meters. Therefore, the Secretary of Energy's office can make use of additional installed capacity from those dehydration plants, which is also outlined in Resolution 698.

Ethanol Producer	Requested Participation	Additional Capacity	Total
Bio Ledesma	49,000	0	49,000
Alconoa	36,000	4,000	40,000
Bioenergética La Florida	25,000	35,000	60,000
Energías Ecológicas Tucumán	19,200	5,900	25,100
Bio Trinidad	17,000	5,000	22,000
Bioenergía Santa Rosa	10,000	20,000	30,000
Bioenergía La Corona	10,000	14,000	24,000
Rio Grande Energia	8,200	4,000	12,200
Bio San Isidro	6,000	0	6,000
Total (in cubic meters/year)	180,400	87,900	268,300

Source: Annex to Resolution 698/09 from Secretaría de Energía

Recognizing the lack of installed capacity by January 1st, 2010, articles 1 and 2 of this resolution establish that these individual mandates are subject to each company keeping its promised capacity addition commitments, and the Annex to the Resolution includes the volumes committed to on a monthly basis, summarized below:

Ethanol producer	Availability First Semester 2010	Availability Second Semester 2010	Total
Bio Ledesma		49,000	49,000
Alconoa	18,000	40,000	58,000
Bioenergética La Florida	18,000	60,000	78,000
Energías Ecológicas Tucumán		25,100	25,100
Bio Trinidad	2,500	22,000	24,500
Bioenergía Santa Rosa	15,000	30,000	45,000
Bioenergía La Corona	12,000	24,000	36,000
Río Grande Energía		12,200	12,200
Bio San Isidro		6,000	6,000
Total (in cubic meters/year)	65,500	268,300	333,800

Source: Annex to Resolution 698/09 from Secretaría de Energía

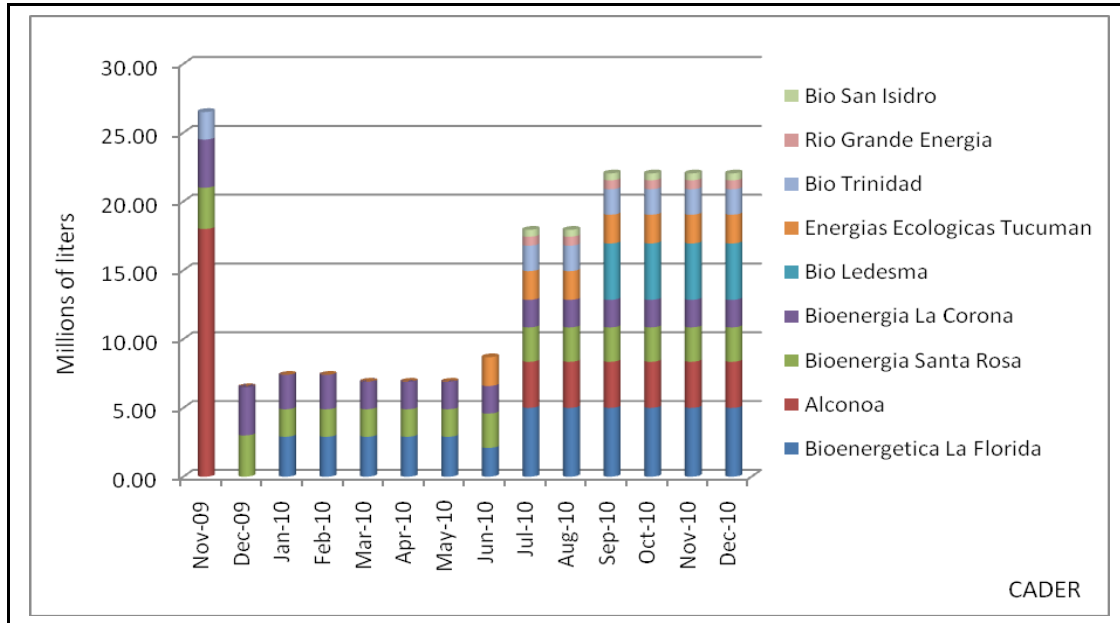
Afterwards, in October 2009 Resolution 733 was published which further refines the commitments made in Resolution 698 to more specific levels, establishing monthly production targets by company. The Annex to this Resolution shows that by the end of 2010, national production will exceed 200,000 cubic meters of ethanol:

Deshidratadora (Millones de litros por mes)	Nov-09	Dic-09	Ene-10	Feb-10	Mar-10	Abr-10	May-10	Jun-10	Jul-10	Ago-10	Sep-10	Oct-10	Nov-10	Dic-10
Bioenergía Santa Rosa	3,00	3,00	2,00	2,00	2,00	2,00	2,00	2,50	2,50	2,50	2,50	2,50	2,50	2,50
Bioenergía La Corona	3,50	3,50	2,50	2,50	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00
Alconoa	18,00								3,35	3,35	3,35	3,35	3,35	3,35
Bio Trinidad	2,00								1,85	1,85	1,85	1,85	1,85	1,85
Compañía Bioenergética La Florida			2,90	2,90	2,90	2,90	2,90	2,90	5,00	5,00	5,00	5,00	5,00	5,00
Río Grande Energía									0,65	0,65	0,65	0,65	0,65	0,65
Bio Ledesma											4,10	4,10	4,10	4,10
Bio San Isidro									0,50	0,50	0,50	0,50	0,50	0,50
Energías ecológicas de Tucumán								2,09	2,09	2,09	2,09	2,09	2,09	2,09
Oferta disponible agregada	26,50	6,50	7,40	7,40	6,90	6,90	6,90	9,49	17,94	17,94	22,04	22,04	22,04	22,04
Oferta acumulada	26,50	33,00	40,40	47,80	54,70	61,60	68,50	77,99	95,93	113,87	135,91	157,95	179,99	202,03

Source: Annex to Resolution 733/09 from Secretaría de Energía

This Annex actually contains minor mathematical errors in the addition, but the end result is the same. Graph 3 below shows this information in another format; the two largest market participants are Alconoa (Grupo Tabacal) and Bioenergetica la Florida.

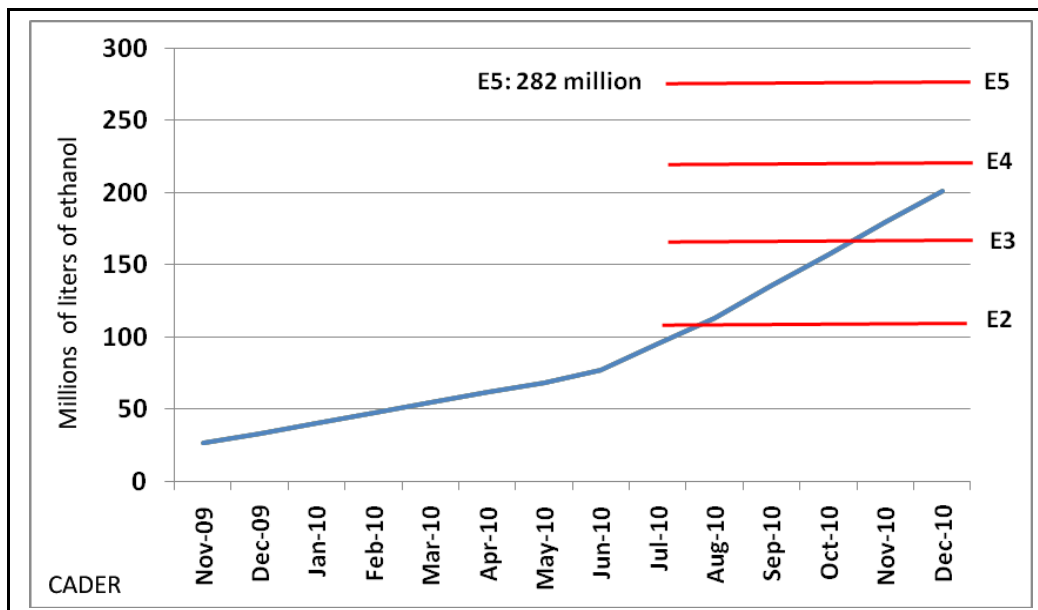
Graph 3: Monthly capacity addition commitments by ethanol producers for 2010



Source: Annex to Resolution 733/09 from Secretaría de Energía

Thus these Resolutions allow us to see that Argentina will end 2010 with production levels at almost E4 levels:

Graph 4: Ethanol availability for the domestic market in 2010



Source: Resolutions 698 and 733/09 from Secretaría de Energía

Ethanol Price and Market Size

Resolution 1294/08 establishes in its Annex the two formulas that determine the price of ethanol; the Secretariat is required to use the higher of the two that result (see page 6 of *Biofuels Policy in Argentina* for a detailed description of both formulas), which is then published monthly on the Energy Secretariat's website.³ The price is ex-works the distillery, i.e., the blender must pick up the ethanol. This price is quoted on the website each month and is quoted in pesos per liter. The price for the month of May 2010, \$2.70 pesos/liter, is equivalent to US\$0.69/liter or US\$2.61 per gallon. As a comparative point, in Brazil, the latest wholesale prices quoted on the government website was the equivalent of \$3.03 pesos/liter, according to *Agência Nacional do Petróleo, Gás Natural e Biocombustíveis*.⁴

Mes	Precio del Bioetanol según Res. SE 1294/2008 [\$ / l]
Mayo 2010	2,700
Abril 2010	2,660
Marzo 2010	2,648
Febrero 2010	2,580
Enero 2010	2,546
Diciembre 2009	2,491
Noviembre 2009	2,440
Octubre 2009	2,402
Septiembre 2009	2,391
Agosto 2009	2,248
Julio 2009	2,247
Junio 2009	2,245
Mayo 2009	2,160
Abril 2009	2,154
Marzo 2009	2,190
Febrero 2009	2,189
Enero 2009	2,138
Diciembre 2008	2,064

Source: Secretaría de Energía

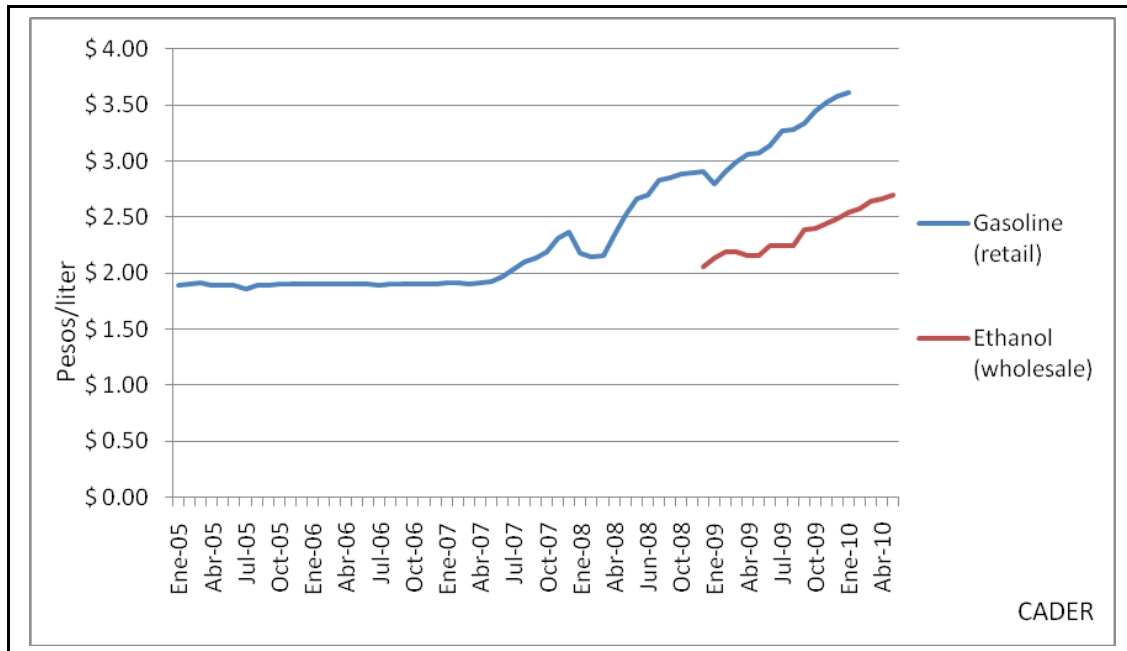
If we superimpose historical retail prices for super gasoline (data obtained from the Energy Secretariat's website)⁵ to the historical wholesale prices of ethanol, we get the results seen on Graph 5, below. The Secretariat has been providing monthly prices for ethanol since December 2008, after Resolution 1294/08 came out, even though the mandate didn't begin formally until January 2010.

³ See: <http://energia3.mecon.gov.ar/contenidos/verpagina.php?idpagina=3033>

⁴ See: http://www.anp.gov.br/preco/prc/Resumo_Quatro_Regiao.asp?cod_combustivel=997

⁵ See: <http://energia3.mecon.gov.ar/contenidos/verpagina.php?idpagina=937>

Graph 5: Comparison of retail gasoline and wholesale ethanol prices



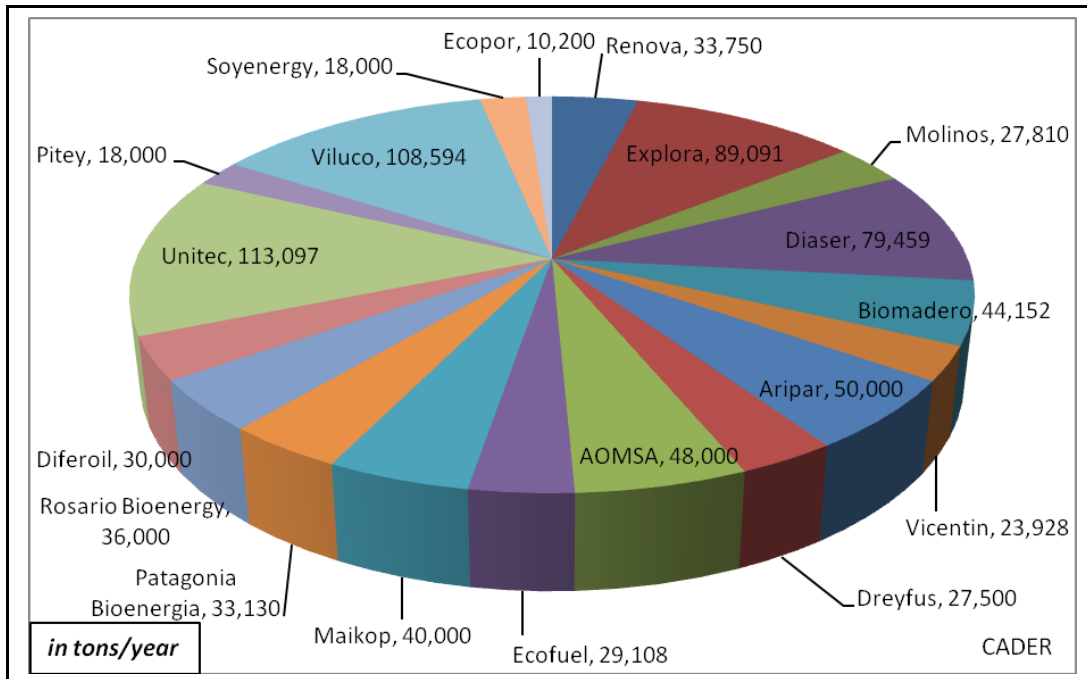
Source: Secretaría de Energía

We see here that the approximate margin between the ethanol wholesale price and the retail price of gasoline is approximately one peso per liter, (equivalent to US\$0.26/liter or US\$0.98/gallon), whereas the same spread for biodiesel as seen later is only about \$0.15 pesos a liter. However, transportation costs for ethanol are generally greater, as ethanol production is located in the far NW corner of the country and far from blending terminals and consumption (see Map 1, page 22). Bear in mind that this price comparison is imperfect; this study seeks only to provide an initial overview of how the industry operates.

Given that the E5 market is estimated at 282 million liters, and using this month's price of \$2.70/liter, the Argentine ethanol industry is valued at some \$760 million pesos, or almost US\$200 million annually. In 2010, because startup has been slow, we estimate it will total \$530 million pesos (US\$135 million).

BIODIESEL

Graph 6: Companies assigned to supply the domestic biodiesel market in 2010



Source: Resolution 7/10 from Secretaría de Energía

Argentina began to produce biodiesel in significant quantities before ethanol, but did so in a less orderly manner. Even though Biofuels Law 26.093 addresses biodiesel issues more than it does ethanol, it still was unable to get investors to commit to the domestic market: of the twenty biodiesel plants currently authorized to produce biodiesel by the Energy Secretariat,⁶ every one of them focus on the export market -- and none on the domestic market.

As outlined in earlier studies by our organization, before beginning construction of a biodiesel plant, investors must choose if they intend to export their product or supply the domestic B5 mandate. They cannot do both under law 26.093. An investor that chooses to supply the domestic market has access to certain incentives such as accelerated depreciation, but also a number of restrictions and limitations, primarily on shareholders (for example, foreigners cannot have a controlling interest and the Argentine controlling shareholders must come from certain sectors). In a country where obtaining investment is already difficult, any form of limitation sends the wrong message. The result was that all plants have chosen the "Export" box, which provides no incentives and is heavily taxed -- but contains fewer restrictions for shareholders. This left no producers that complied with the requirements to supply the domestic market -- even though installed capacity could theoretically today supply a domestic B20 mandate given a freer market. Thus, in order to begin the B5 mandate this year, new resolutions and exceptions to Law 26.093 had to be drawn up.

⁶ See list at <http://energia3.mecon.gov.ar/contenidos/verpagina.php?idpagina=3037>

Fortunately, the government took into account the proposals made by our chamber in our April 2009 study, where we suggested allowing any approved biodiesel plant to supply the domestic market beginning in 2010, even if as a temporary solution, foregoing the fiscal incentives and ignoring the shareholder restrictions. At the end of 2009 the government did just this: it began a dialogue with all biodiesel producers to gauge their interest in supplying the domestic market. Here we must mention the role played by CADER's Biofuels Committee, ably led by Jose Luis Martinez Justo, in ensuring that the small and medium enterprises be allowed to have first rights to supply the domestic market, in keeping with the spirit of the biofuels law, which favors smaller plants distributed throughout the country in order to create more jobs and decentralize the industry. The small and medium biodiesel producers have a harder time competing in the very competitive international markets for a number of reasons: no control over their own feedstock; distance between the feedstock source as well as to ports; insufficiently large volumes to allow them to compete directly in international markets; and above all, a lack of working capital financing -- a key issue in the biodiesel industry.

Legal and Regulatory Framework for Biodiesel

Resolution 129/01: Defines biodiesel.

Law 26.093/06: Biofuels law. Biodiesel and ethanol mandates. Participating enterprises. Application Authority.

Decree 109/07: Regulations for Biofuels Law.

Resolution 266/08: Registry of universities authorized to perform technical, environmental, and safety audits on biofuels plants.

Resolution 1296/08: Fire safety requirements for biofuels plants.

Resolution 6/10: Quality specifications for biodiesel.

Resolution 7/10: Announces the list of producers that comprise the domestic mandate during calendar 2010, as well as the formula used to determine the wholesale price.

Texts for each of the above legal framework can be found on CADER's website at www.argentinarenovables.org/leyes.php, but unfortunately, in Spanish only.

Beginning in October 2009 biodiesel producers were invited to meet with government officials to discuss the mandate and a price formula. But given that the biodiesel market is almost four times larger than the ethanol market, more was at stake: access to a market that is more than US\$700 million a year. After many meetings and roundtables, an informal agreement was reached in December 2009; in February 2010 Resolution 7/10 was published, with an Agreement signed by the companies that commit specific volumes (during calendar 2010 only) and also agree to a price formula, thus circumventing the existing law and decree.

To reach this Agreement, the government first invited each of the biodiesel producers to propose a volume they would be willing to supply to the domestic market assuming the negotiated price formula was formalized. Chart 1 below shows what each producer offered to the government in Column (B). As the offer exceeded the B5 requirement by more than half a million tons (the offers were 61% greater than

the required 859,819 tons/year), the government distributed the mandate as shown in Column (C) below. This is what was formalized in Resolution 7/10. Finally, the ratios in Column (E) demonstrate that the small and medium producers were more successful in gaining a share of the domestic market, and Column (F) that the spirit of the biofuels law was respected. CADER represents the interests of the small and medium producers, almost all of which are members of our chamber.

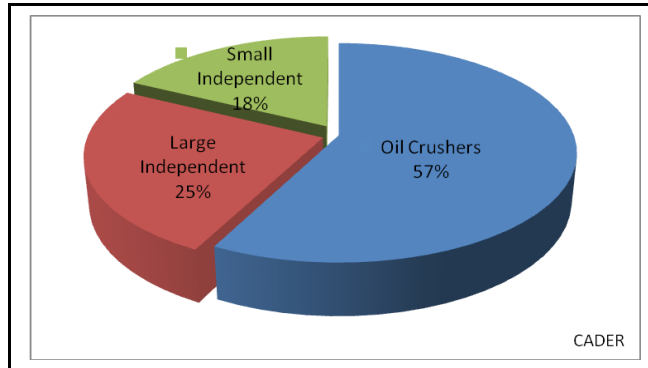
Chart 1: Allocation of the domestic biodiesel market for 2010

<i>(in tons/year)</i>	(A) Installed Capacity	(B) Volumes Offered for Domestic	(C) Volumes Assigned by govmt	(D) Volumes Available for Export	(E) % Capacity Assigned to Domestic	(F) % of Volume Assigned to Offered
Renova	480,000	144,000	33,750	446,250	7%	23%
Dreyfus	300,000	84,000	27,500	272,500	9%	33%
Patagonia Bioenergía	250,000	84,000	33,130	216,870	13%	39%
Ecofuel	220,000	72,000	29,108	190,892	13%	40%
Unitec	220,000	230,000	113,097	106,903	51%	49%
Viluco	200,000	200,000	108,594	91,406	54%	54%
Explora	120,000	120,000	89,091	30,909	74%	74%
Molinos	100,000	36,000	27,810	72,190	28%	77%
Diaser	96,000	96,000	79,459	16,541	83%	83%
Biomadero	72,000	48,000	44,152	27,848	61%	92%
Vicentin	64,000	24,000	23,928	40,072	37%	100%
Aripár	50,000	50,000	50,000	0	100%	100%
AOMSA	48,000	48,000	48,000	0	100%	100%
Maikop	40,000	40,000	40,000	0	100%	100%
Rosario Bioenergy	36,000	36,000	36,000	0	100%	100%
Diferoil	30,000	30,000	30,000	0	100%	100%
Pitey	18,000	18,000	18,000	0	100%	100%
Soyenergy	18,000	18,000	18,000	0	100%	100%
Ecopor	10,200	10,200	10,200	0	100%	100%
TOTALS	2,372,200	1,388,200	859,819	1,512,381		CADER

Source: Resolution 7/10 from Secretaría de Energía

In an earlier study by our chamber we segmented the Argentine industry into three classes or castes, each with different strengths and weaknesses. While in some cases some of these producers are hybrids of more than one caste, this division remains useful to understand market segmentation. Graph 7 below shows how the current installed capacity of 2.37 million tons from Column (A) above are broken down:

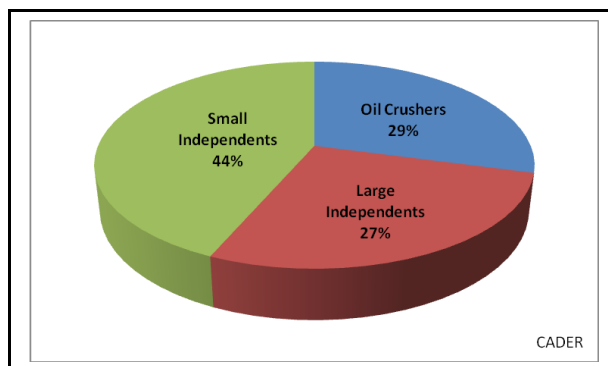
Graph 7: Breakdown of biodiesel installed capacity by producer class



“Oil Crushers” represent the large multinational oilseed crushers with the largest plants and ample access to feedstock; “Large Independents” are large plants but without access to their own feedstock; and “Small Independents” are the small and medium producers with none of the above, but count on the government’s support from a policy level. Given their control over the feedstock, the Crushers are slowly gaining increasing influence in the biodiesel industry, as more and more plants end up working on some variation of tolling arrangements for them.

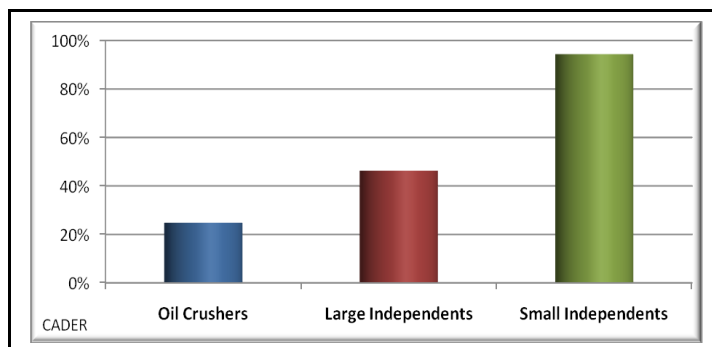
Graph 8 below shows how the domestic mandate for the 859,819 tons of biodiesel was allocated according to producer class.

Graph 8: Breakdown of the domestic biodiesel market by class



And finally, Graph 9 below shows that the Small Independents are dedicating virtually all of their productive capacity towards the domestic market, while Large Independents supply 46% of their installed capacity and the Oil Crushers less than 25% -- which allows them to continue to focus on developing export opportunities where their particular competitive advantage lies.

Graph 9: Percentage of installed capacity assigned to domestic market by class



Biodiesel Prices and Market Size

Resolution 7/10 establishes in its Agreement the formula that is used to determine the price (calculated monthly and published on the Energy Secretariat's website)⁷ for biodiesel. This price is ex-works, i.e., sold at the biofuel producers door and is quoted in pesos per ton. The price for the month of May 2010, \$3,430.61 pesos/ton, is equivalent to \$3.01 pesos/liter (US\$880/ton; US\$0.77/liter, or US\$2.91/gallon); and approximates international levels. Brazil, with higher fuel prices generally, recently completed a biodiesel auction for their domestic market, and the winning bids were allocated at the equivalent of US\$1,466/ton, well above international levels.

Mes	Precio del Biodiesel [\$ / Tn]
Mayo 2010	3430,61
Abril 2010	3425
Marzo 2010	3389
Febrero 2010	3276
Enero 2010	

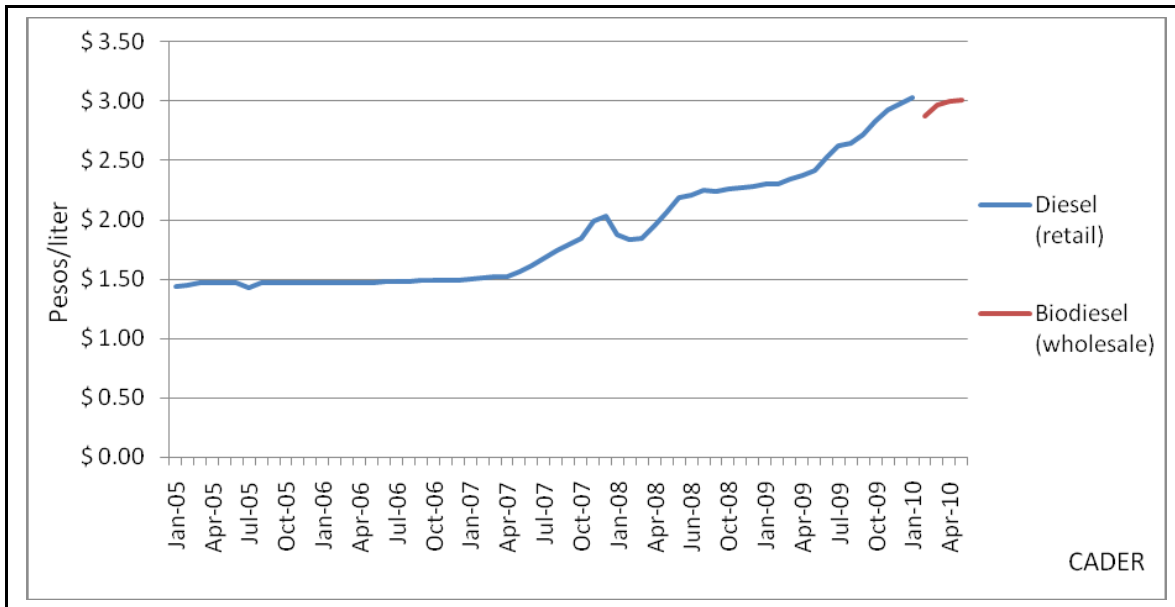
Source: Secretaría de Energía

If we combine historical retail diesel prices (data from the Energy Secretariat's website)⁸ with these wholesale biodiesel prices in the chart above, we get Graph 10:

⁷ See: <http://energia3.mecon.gov.ar/contenidos/verpagina.php?idpagina=3033>

⁸ See: <http://energia3.mecon.gov.ar/contenidos/verpagina.php?idpagina=937>

Graph 10: Comparison of retail diesel and wholesale biodiesel prices



Source: Secretaría de Energía

We see here that the approximate spread between the biodiesel wholesale price and the diesel retail price is only about \$0.15 pesos/liter (about US\$0.04/liter), whereas, as we saw in the case of ethanol/gasoline, their spread is closer to one peso/liter. Note however that we are not comparing exactly “apples to apples”; the intent in this first study is merely to provide an initial starting point to understand the market. The downstream oil & gas companies bear the cost of picking up the biodiesel at the plant and deliver to the blending terminals – not a small undertaking – as well as the various administrative and logistical matters inherent. This reduced margin may help explain why they have sought to delay the beginning of the biodiesel mandate.

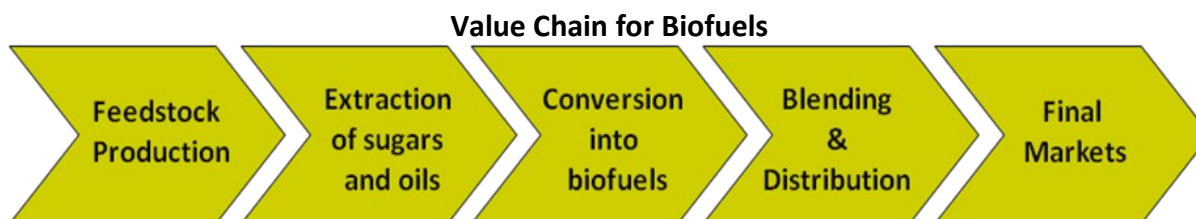
Given an annual market for 859 thousand tons of biodiesel (which is likely to be reached in 2011 since we began late this year) and using this month’s price of \$3,430.61 pesos/ton, the domestic biodiesel market would reach about \$2.9 billion pesos, or approximately US\$750 million dollars, per annum. This is almost four times the size of the ethanol market.

We continue to promote an increase to B7 (ideally beginning the second half of 2011, after all kinks in the system have been worked out) and B10 (in late 2012). This broadening of the domestic market will be supplied initially by the Oil Crushers and Large Independents, which have capacity to spare. The challenge will be ensuring that the existing as well as any new small and medium producers might continue to participate in this market, as they generate more jobs and distribute wealth better. At current prices, a B7 market would generate about a billion dollars a year in revenue, while a B10 market would generate about US\$1.5 billion annually.

Undoubtedly, this market will continue to be interesting for the coming years.

Biofuels Distribution and Logistics

Once converted into biofuel, the industry's value chain continues on through two more links: *Blending and Distribution*, and *Final Markets*. CADER's member base includes companies involved in each stage of this value chain.



Map 1 below provides an insight into the logistical complexities and costs that need to be absorbed by the blenders and retailers in these last two stages. In the downstream oil & gas industry, four companies dominate: YPF, with a market share of 53%; Shell with 17%; Esso, 14%; and Petrobras, 12%. The remaining 4% is held by a variety of smaller players.

The ethanol industry is concentrated in the NW corner of Argentina because sugar is grown in the provinces of Tucumán, Jujuy and Salta. The biodiesel industry is slightly less concentrated, but is still mostly based in Santa Fe province, in the heart of the soy and oilseed crushing industry.

The downstream blending terminals are located close to population centers such as the city of Buenos Aires, and Rosario, in Santa Fe province.⁹

- **YPF** has a total of six blending terminals: Mendoza province (for ethanol and biodiesel); San Lorenzo, province of Santa Fe (biodiesel and ethanol); the southern province of Neuquén (biodiesel only); La Plata, Buenos Aires province (biodiesel); La Matanza, Buenos Aires province (biodiesel); and province of Córdoba (ethanol only).
- **Shell** has four blending terminals: Chaco province in northern Argentina; Rosario and Santa Fe cities, both in the province of Santa Fe; and Dock Sud, Buenos Aires province.
- **Esso** blends in three terminals: San Lorenzo, Santa Fe (biodiesel, and for now the only place to blend ethanol as well); Campana, Buenos Aires; and Bahía Blanca, Buenos Aires.
- **Petrobras** currently has three terminals, although the company recently agreed to sell one to an Argentine consortium: in Bahía Blanca, Buenos Aires province; San Lorenzo, Santa Fe; and Dock Sud, Buenos Aires. They also have the country's southernmost terminal in Caleta Paula, near Comodoro Rivadavia, Chubut province in the deep Patagonia. All of these blend biodiesel and ethanol.

Argentina has the 8th largest area in the world, and distances to these links in the value chain are no small matter: for example, the distance between the largest ethanol producer in the northernmost province of Jujuy to the concentration of blending terminals around the city of Buenos Aires is more than 1,500 kilometers (over 900 miles); the distance between biodiesel production in the province of Santa Fe to a blending terminal in the western province of Mendoza is more than 800 kms (500 miles). Argentina does

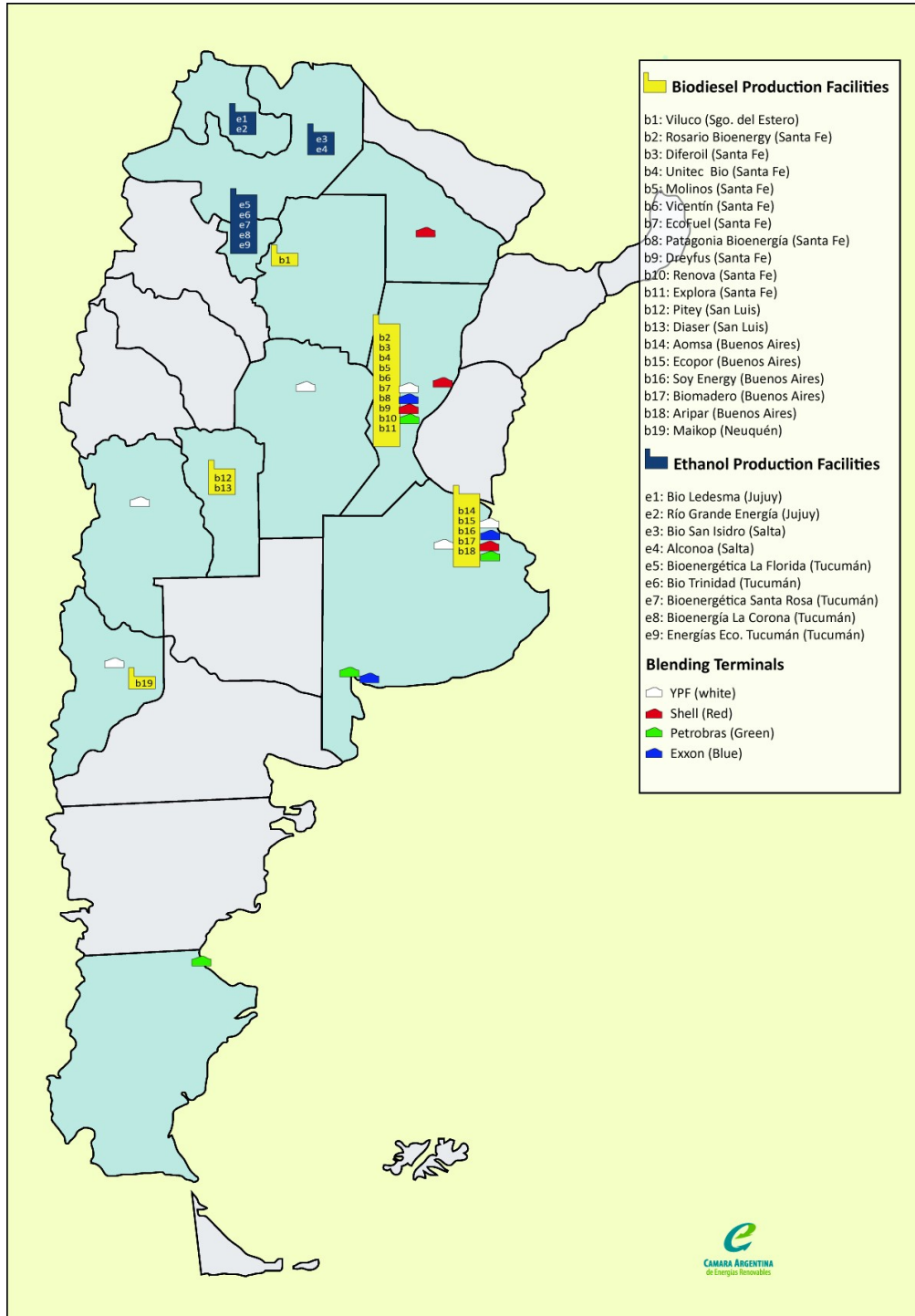
⁹ See also: <http://energia3.mecon.gov.ar/contenidos/verpagina.php?idpagina=3230>



not have piping installed to facilitate this transportation, nor an effective rail system; either option would be more efficient over the long run. Thus, fuel distribution is all done by truck.

Argentina has historically been a small exporter of gasoline and a net importer of diesel. The new B5 and E5 mandate will reduce significantly the amount of diesel that has been imported over the years (which was also high in sulfur content), and will allow for some additional gasoline exports, although export taxes (“*retenciones*”) are approximately 49%.

Map 1. Map of Argentina showing biofuel production locations and blending terminals





Conclusions and Perspectives

The domestic biofuels market has commenced in Argentina with little fanfare. While it may have begun with delays, the fact that it has commenced is in itself an event of such significance that the delays are minimal compared to the positive implications for the country: new investment; job creation; a cleaner, domestically-sourced renewable energy matrix; and above all, one clear stride towards a path of sustainability and respect for environmental obligations.

In April biodiesel began to flow throughout the system and into automobiles and tractors and trucks. Some 70 million liters (18 million gallons) of biodiesel were sold, and coupled with the ethanol mandate that began in January delivering some 45 million liters (12 million gallons) to date, we have a total of 115 million liters (30 million gallons) of biofuels sold into the retail market thus far this year as part of the B5 and E5 mandate.

A big part of this success is borne of Argentina's abundance of natural resources such as in soy oil, which we know will prove to be a valuable feedstock for the global industry for many years to come. Argentina currently has an excess of soy oil due to the temporary closure of exports to the Chinese market; some quarters have proposed that we automatically increase the mandate to a B7 or even B10, given that we have an abundance of installed capacity. A mere increase to a B7 market represents 340,000 tons of annual additional soy oil that would be routed into the energy market. However, a short term solution could bring long term problems. Our industry needs to be prudent with this nascent market and consider the disruptive effect it could have on the industry's *entire* value chain: in the same year in that a delayed B5 is implemented, increasing it unexpectedly to a B7 – or even a B10 – is a short term solution that Argentina should consider with much caution.

We need to ensure that our decisions are methodical and well thought out, putting foremost the proper functioning of each link and the entirety of the industry's value chain, remembering that a chain is only as strong as its weakest link. We need to begin to work as one value chain rather than independent links and make the adjustments necessary to establish one strong industry.

There is no shortage of conflicts of interests or problems to confront in these early days of the domestic market. We nonetheless congratulate each and every one of the stakeholders and links for their work to date, secure in the knowledge know that the upside is far too great not to succeed in the end.

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Acknowledgements

CADER and the author wish to thank the individuals, companies and institutions that shared information for the completion of this study. We particularly want to thank our sister organizations for their information and support; the downstream fossil fuel blenders for their commentary and corrections, as well as the many biofuel producers and the Argentine Energy Secretariat for their habitual support. This study represents a collaboration among stakeholders whose interests are often in conflict; working with them has been a pleasure and shows how much can be accomplished working together. Any possible errors or omissions in this document, however, are the exclusive responsibility of CADER and the author.

About the Argentine Renewable Energies Chamber

The Argentine Renewable Energies Chamber (*Cámara Argentina de Energías Renovables*, or CADER) is a non-profit industry trade organization dedicated to promoting the sustainable development of alternative energies in Argentina. Its mission is to protect the interests of its members, pushing for the establishment and development of a vibrant and respected industry, respected globally and with the highest standards, practices and focus.

The first requirement to achieve this development is providing access to accurate information. Thus, CADER publishes on a regular basis studies on different sectors of the renewable energies industry in Argentina, describing objectively its state and opining on areas that need further improvement, with a goal of making Argentina an attractive investment center.

CADER recently celebrated its second anniversary. Much has been accomplished in this short period, and the chamber has also crossed the 100-member mark. This broad cross section of members representing every aspect of the industry's value chain gives it the legitimacy to speak on its behalf, but with the concurrent challenge of often representing conflicting interests. This last point is especially part of CADER's philosophy since inception: to help Argentina establish a position as a global player in renewable energies and one of its leaders.

For more information, please visit our website at www.ArgentinaRenovables.org, write us at info@cader.org.ar, call us at +54-114-515-0517, or visit our offices at 524 Viamonte Street, Suite 101, Buenos Aires, C1053ABL, Argentina.

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