

# **The Political History of Sugarcane-based Ethanol in Brazil**

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Political Science Senior Thesis

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May 2014

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## **Abstract**

*With the Middle East putting an embargo on oil in 1973, oil prices ascended to levels that made importation of oil expensive. Brazil also faced another issue with sugar prices going down in 1973, putting much of their sugar supply on reserve. Brazil's military government then made a decision to adopt the sugarcane-based ethanol program, Pro-Alcool. Pro-Alcool's goal was to produce an alternative energy source to gasoline and take pressure off of oil importation. While initially intended to be a short-term fix, a second oil strike in 1979 pushed Pro-Alcool to higher levels. Oil industries were initially opposed to ethanol production, and the auto industry was hesitant to produce ethanol-based vehicles. Brazil would adopt democracy in 1985 which would lead to the end of Pro-Alcool in 1991. This would lead to a decline in ethanol production through the 1990's. Ethanol would, however, find revitalization with new technology and a new coalition of advocates that would include the sugarcane industry, Petrobras, and the auto industry pushing ethanol production to a new level within Brazil.*

## Introduction

When the first oil strike hit the world, there was a panic that oil would become sparse, if not entirely depleted in the rest of the world. While many nations took precautions in order to preserve oil and hope for either a new supply or for a resolution in the Middle East. For Brazil, they realized that they could potentially alter the biofuel game with converting sugarcane to ethanol. With a sugar market that had declined due to low prices, an excess of sugar had built up within Brazil. There was no real incentive to export due to the low price of sugar. With this in mind, many forces within Brazil started a discussion whether to make a major effort to jumpstart ethanol production or to hope for oil prices to stabilize. By 1975, they had established Pro-Alcool to enhance the ethanol market.

Within the next 39 years, the ethanol sector has had both positive and negative factors that have led to the impact it has made on Brazil today. It has grown to a level where Brazil produces the second most amount of ethanol today. Ethanol has made the growth and conversion of ethanol the largest job market in Brazil today, allowing for an easier source for employment in a borderline first-world nation.

While there have been major influences outside of the government on the ethanol market, there is a correlation between a majority of ethanol factors and those in power. The purpose of this thesis is to prove that the ethanol sector of Brazil has been strictly political and has been created because of the decisions made by the leaders of Brazil, and not from free market economics, or a demand for sustainable energy choices. There are environmental implications that ethanol brings to the table relative to oil. However, it was not the reason the ethanol sector was enhanced to the level it is today. I argue that politics has dominated the ethanol industry instead of economics or environmental factors.

## **Political History of Brazil**

The first interest in ethanol came in the early 1900's when Rudolph Diesel used peanut oil (Pousa et al, 2007). However, petroleum was cheaper and more efficient to make, and the market for oil took over for vehicles, leaving peanut-based ethanol to be a failure of sorts. Brazil had its own share of experimentation in the development of alternative fuels, from cotton seed to coconuts. They were only seen as emergency fuels, never as a substitute to petroleum. By 1931, the Institute of Sugar and Alcohol was created (Masiero, 2011). While this institute would improve technology for both producing sugar at a higher rate and converting it into ethanol, they would not make a major impact on the ethanol market. Ethanol would be integrated at small levels and blended with gasoline fuel for cars, hovering around 5-10% for about the next forty years. With the focus on oil-fueled gasoline within Brazil, the market for ethanol would not be a significant one.

### **The Introduction of Pro-Alcool**

The ethanol market would first be discussed in a serious manner in 1973, when the first global oil crisis occurred (Moreira & Goldemberg, 1999). This oil shock would lead to the Brazilian government under the military rule of Emílio Garrastazu Médici (Kesselman et al, 2010) to try and find alternative sources of fuel, as 80% of petroleum in Brazil was imported at the time (Martines-Filho, et al, 1999), Brazil was running into shortages in gasoline, leading to inflation. In 1975, sugar prices fell significantly, while oil prices continued to spike in price (Soccol, et al, 2005). Brazil spent the next two years going through the pros and cons of whether converting sugar into ethanol would be a feasible and realistic idea in Brazil.

(Table 1 about here)

Those not in favor of Pro-Alcool listed in Table 1, felt that Pro-Alcool would not be an economically sound decision. Petrobras knew that the global oil strike could potentially bankrupt them, and were trying their best to take focus off of ethanol and spark interest in finding new oil reserves within Brazil (Barzelay, 1986). To a point, Petrobras did find oil within the Campos basin by the end of 1974, taking off some of the pressure of oil importation. Even with the Campos basin, Brazil took a 4.69 billion dollar hit on trade in general in 1974 alone, a major difference from a seven million dollar surplus acquired the year before. With those staggering deficits, there was little argument that Petrobras could make. The economy was inflating at a high rate and oil importation rates were too high for them to deter Pro-Alcool.

The other organizations within Table 1 figured that Pro-Alcool would lead to inflation within Brazil and would not be beneficiary for the economy as a whole. They figured that Brazil was already in a downward spiral, and did not need to take a risk on their major export and should just wait until international sugar prices increased and ethanol prices decreased. They wanted to put more money into expanding oil exploration, as Petrobras needed the equity to keep from bankrupting. Even after Pro-Alcool was passed, The Bank of Brazil had a policy where they could decline loans if they felt they would not be sustainable for the economy of Brazil or could be identified as, “bad loans,” that they felt would not be paid back to the bank with interest. From the passing of Pro-Alcool to May of 1977, only 28 of 112 subsidies planned out by the government for implementation of Pro-Alcool had been passed. The major reason they were able to do this was the fact that Pro-Alcool was originally introduced as a temporary plan until sugar and oil prices stabilized. While there were bumps in the road for passing Pro-Alcool, there were too many supporters for the ethanol industry.

(Table 2 about here)

For the major sugar syndicates listed in Table 2, Pro-Alcool was all around a solid plan. Putting major amounts of the sugar surplus into an impermanent agenda allowed for them to take advantage of an industry that needed a boost. Sugar prices had not met expectations by 1975, and new President Ernesto Giesel was looking to make his mark when he became President the year before. Giesel used to be head of Petrobras, and knew the issues hitting their market today. Being a conservative leader, he wanted to find a resolution within the nation instead of outside Brazil. With ministries feeling that the trade deficit was becoming an alarming amount, they figured the way to fix the energy crisis was through ethanol, not oil. Another key reason was that the Brazilian job market would improve, as people would be able to work in the conversion and distribution processes of ethanol. All in all these major influences were too much for Brazil not to take advantage of. The impermanence of this plan was the way the government would fund the ethanol sector. Once oil prices dropped to a sustainable level, and/or sugar prices increased that made exportation a profitable margin again, the Government would allow the market to decide ethanol's overall effect on Brazil.

### **Success of Pro-Alcool**

On November 14<sup>th</sup>, 1975, Brazil adopted Pro-Alcool, a program designed to put effort into converting sugar to ethanol. They would turn sugarcane, cassava, and sorghum into ethanol as an alternative option to gasoline as a primary source of fuel. Brazil would support Pro-Alcool with subsidies to the industrial and agricultural sectors, allowing for interest rates below market levels (Oliveira, 2002). Gas stations would also be adjusted to carry ethanol in their pumps, as well as the E15 fuel initially designed to be the mix. Despite only being 15% of the gasoline mix, ethanol production would have to climb from 600,000 liters a year to three billion liters a year (Santos, 1985). Despite these grand plans, this was intended to become a temporary plan until oil

prices dropped to a reasonable price, or the international price for sugar increased to a level where exportation was a feasible option. This led automobile companies to become hesitant to invest in ethanol-fuel cars if there was no market in the future. Creation of vehicles for a small time frame would seem useless, especially since automobile engine conversions were possible.

(Table 3 about here)

This would change in 1979, when the second oil strike would hit as the Iraq-Iran war led to both nations having their oil exportations cut significantly. This changed Pro-Alcool's status from temporary to a necessity in Brazil's eyes. This was the step that helped give the automobile industry the push to produce ethanol-fueled cars, which were sold at solid rates from 1979-1990. The gasoline-ethanol mix would have strong competition here on out with E100 becoming one of the major fuels in Brazil.

(Figure 1 about here)

In 1978, ethanol-based fuel cost about 64.5% of the price of oil-based gasoline, making it a competitive fuel. Ethanol has about 70% of the mileage that gasoline has, so as long as pure ethanol fuel is 30% cheaper than gasoline, ethanol fuel comes out at the same efficiency to price level. Subsidies were also used to create distilleries to convert sugar to ethanol. Most sugar mill owners were sold on ethanol production, as it produced more jobs for the people and expanded sugar production as a whole. One issue, however, they had was that they felt that there would be a food shortage within the nation. However, the expansion of sugarcane at this time made coverage of both sugar and ethanol fuel not only a possibility, but a positive way to counter the oil shocks. By 1980, ethanol sales were 40% of gasoline, making ethanol vehicles were a hot commodity. Despite the subsidies, many projects to improve technology, create distilleries, and adjustments to gas stations, many were not funded by the Bank of Brazil. The Bank of Brazil



was the major structure of government funding, and had powers grandfathered in that even the military-powered government could not touch. The Bank of Brazil could decline “bad” loans, and did so especially during the first few years of ethanol production when Pro-Alcool was only seen as a temporary policy. Despite this loophole, Pro-Alcool was able to flow through about 1985, when the Brazilian Government experienced a democratic revolution.

### **The Decline of Pro-Alcool**

ProAlcool started to fall out of favor due to the low amounts of money being made by the people farming sugarcane. With this movement, along with the oil prices falling to affordable levels, the shift from oil produced gasoline to ethanol gasoline started to fall. Ethanol vehicles were not coming off so well, having problems with starting, corrosion, especially among retrofitted vehicles that were gasoline vehicles converted by mechanics to intake ethanol. Starting was an issue because ethanol has difficulty starting in temperatures below 15 degrees Celsius (59 degrees Fahrenheit). With the disbandment of the military regime in 1985, many political groups in power felt that ProAlcool was unnecessary, partially due to the fact that the military regime was a huge supporter of ProAlcool.

Compared to 1975, after the first oil shock, oil importation spiked from 25.2% of total imports within Brazil to 47% in 1985 (Amann & Baer, 2011). About 11.7 billion liters of ethanol-based gasoline was produced in 1989, while 4.5 million cars were alcohol only fueled cars, 9.5 million having a mix of the two different fuels. The media favored an anti-ethanol agenda on Brazil at this time due to the transition into democracy (Santos, 1985). The newly established government attempted to put down all of the military governments major innovations, and Pro-Alcool happened to be one of them. With their negative spin, the ethanol market would have a negative turn of events over the next few years.

In 1987, economic issues hit Brazil hard, and many ethanol subsidies were taken off that Pro-Alcool helped initiate. By 1989, inflation hit Brazil. To counter inflation, more sugar was exported, leading to ethanol shortages for the next couple years. From 1990-1994, a shift occurred where more gasoline blended with ethanol was used, this was a change from using ethanol-only fuel. As gasoline became a very cheap and stable market over the 1990's for Brazil, competition between gasoline and ethanol was very much alive. You can see in Figure 1 how ethanol has a steady increase from 1990 to about 1997, and this was one of the factors that helped the ethanol market.

On February 15<sup>th</sup>, 1991, Pro-Alcool was officially ended, killing off major subsidies for the ethanol market and ending many organizations dedicated to the expansion of ethanol. The decline of ethanol subsidies within the Sao Paulo region of Brazil was not as deflating as it was for the rest of the nation (Stattman et al, 2013). Since there was already so much effort into ethanol production at this point, there was a point made to keep a solid ethanol to gasoline mix. The Brazilian Government passed a law in 1994 that stated that the gasoline-ethanol mix in regular fuel had to be around 20-25%. The effect of Pro-Alcool was too much for Brazil to ignore. This was another reason that ethanol increased in the mid 1990's, as seen in Figure 1. Much of the Brazilian population was working in a sugar-related job, and this law helped stabilize jobs within Brazil. A new issue was hitting Brazil that would benefit ethanol for a few years.

### **Ethanol Market after Pro-Alcool**

Climate control was a major concern in the world at this time, and the effect had a positive effect on ethanol in Brazil. With global warming becoming a major issue, greenhouse gases and carbon fuels have the media putting a negative spin on oil and started to approve more

of ethanol production as a positive environmental biofuel (Santos, 1985). With the 1994 law, ethanol production increased at a steady rate from 1993-1998. While Pro-Alcool was only meant to be an alternative used only to take some of the burden off of heavy oil prices, it forced Brazil to make scientific improvements on every process of ethanol fuel, from growing the sugarcane itself to converting sugar into fuel ready to be used in the vehicle. However, without subsidies, the freight costs, technology research, and all aspects of ethanol production were no longer determined and supported by the government, making ethanol more expensive when brought to the pumps. From 1997-2003, Figure 1 shows that the ethanol market seemed like it had reached a stable rate of ethanol production, but one major industry has been working on a product that would alter the ethanol game.

### **Revitalization of Ethanol**

In 1993, a new vehicle was introduced that could take any amount of ethanol to gasoline, a flex-fuel vehicle simply called flex. While there was a solid concept for this vehicle, it was unsuccessful and improvements would have to be made to complete this design. One flaw is that ethanol has difficulties starting at temperatures below 15 degrees Celsius, or about 59 degrees Fahrenheit. Issues with corrosion, chemicals, and general issues with the engine caused the vehicle to be taken off the market to be refined. Ten years later, these issues were resolved, and the first flex-fuel vehicle was introduced called the Golf 1.6 Total Flex G. With the startup issue, from 2003-2009 there was a separate gasoline section that would start the car. Once it was started, any fluctuation of ethanol or gasoline would fuel the car. Once 2009 hit, an electric heater would increase the temperature to starting levels when needed for ethanol, taking away the need to fill the gasoline-only starting fuel. The rest of the engine kinks were fixed to a point, although issues of corrosion occur to a lesser degree. This was the first vehicle that was able to

take any level of gasoline to ethanol, allowing for consumers to pick out which fuel they wanted to put in their car. Before, you just had to hope the market fuel for the car you chose had the better price, but now you could pick either fuel right at the pump. This led to a revival in E100 fuel development, as ethanol cars had barely been sold or even produced at this point. As shown in Figure 1, ethanol takes off at a solid rate in relation to Flex-Fuel cars being sold. Flex-fuel vehicles have steadily improved their sales within Brazil, and are expected to be the only fuel type sold in Brazil by the end of the decade. The only vehicles not flex-fueled will be imports and diesel-ran vehicles. The flex-fuel vehicle has put a major rise within ethanol, as seen in figure 1. Now that we have reviewed many of the factors that have affected the ethanol market, we can better see what has affected the flow of ethanol as a whole. Brazil's overall success of the program has given other nations curiosity about the ethanol market.

## **International and Environmental Impact**

### **International Outlook**

Interactions with nations that are major exporters of oil affect the ethanol market in Brazil (Barros et al, 2007). Better relations with Iraq, along with other oil leaders, can help Brazil when oil experiences crises. Even when oil prices become a major hassle to deal with, it helps to have good terms with a major oil producer and can help importation when needed.

In terms of ethanol production, with 30 billion liters of ethanol produced in 2010, Brazil has been able to export ethanol into other markets, such as the US, Europe, and Japan. One issue is that Brazil is transitioning from a developing nation into a developed nation. Brazil, Russia, India, and China (BRIC) make a group of rising nations within the past century. Brazil looks to become the top power within South America (Armijo & Burges, 2010). Being a larger nation, they are looked upon to represent South America as a whole, and are making their best impression possible. They look to improve among their status within other powerful nations as a staple for their economy, thus allowing for more prosperous trade within these nations. As Brazil becomes more of a developed nation more roads are going to be needed and more people will be looking to buy vehicles. The amount of fuel needed within Brazil could drastically increase with this transition, and the ability to produce this many vehicles and fuel will be a challenge. In terms of environmental factors, there are mixed results as to whether ethanol is making a positive difference within Brazil and the ethanol industry as a whole.

### **Environmental Outlook**

Ethanol has a positive environmental impact in some aspects when compared to gasoline. For one, ethanol has decreased the overall emissions of carbon dioxide by 189 million tons of carbon dioxide from 2003-2009 (Lacerda et al, 2009). If gasoline was used instead of the ethanol

biofuel, there would have been a 22% increase in greenhouse gas emissions in 2006, and an average around there within the past decade (Filho and Macedo, 2008). It is predicted that the percentage could increase up to 43% in 2020 if gasoline was used instead of ethanol in the future. With each liter of ethanol used, the price needed to mitigate the greenhouse gases decreased by about 20 US cents compared to gasoline, a major factor both environmentally and financially for the nation. There is much agreement that the ozone benefits from ethanol as a whole.

However, it seems as if the negative impacts of ethanol may outweigh the benefits of sugar converted into ethanol. One major issue is that for every one liter of ethanol produced, there is 10 liters of vinasse, a thick by-product of ethanol (Martinelli & Filoso, 2008). Now vinasse has its use, as it is spread back onto crops as a solid fertilizer with nutrients allowing for future sugar crops to flourish. However, when vinasse gets into bodies of water such as rivers and streams, its excessive nitrogen and organic carbon can disrupt the ecosystem and kill off fish. It also can disrupt aquatic systems and alter the water systems as a whole. Another major issue is the major amount of burning done on farms. Farmers burn their fields to get rid of leaves and straw, along with killing off snakes and other species of animals that invade the sugarcane fields. Additionally the yearly burning of the field can lead to soil erosion, soil compaction, and releases aerosolized particles that are harmful for nearby residents to breathe. Their excess burning is negating some of the beneficial impact ethanol makes on the ozone.

Another issue is the land needed for sugarcane production. Needing a drought season to help produce sugar in the cane itself, sugar cannot be pushed into regions of the Amazon where rainfall is plentiful. Instead of expanding to regions it cannot grow sugar because of poor weather conditions, they have taken land from other smaller farms. They have forced them to move their

farms, typically soybeans, into the Amazon rain forest.. This has two major issues. For one, you have major sugarcane organizations moving farmers from their original land to be bought out and moved from their land. Privately owned rural land previously owned by large families has been taken over by the government to achieve their expansion of ethanol production. They take major chunks of land from some farmers and give it to major sugar-producing companies. These transitions can be extreme and lead to violent acts between the families and the ethanol producers. This has been an issue within Brazil, and for about 30 years a party has formed called the Landless Peasants Movement (Quinonez, 2012).

While the Landless Peasants Movement (MST) party has low amounts of money, they can appeal to the masses by using the media to show their side of the land takeover by the government and gain support for their cause. They cannot find a substantial amount of support to get anywhere in terms of political representation, but their voice is heard and current President Dilma Rousseff has acknowledged that the land reform issue to be an issue of human rights. Despite the movement, little has been done to discourage the Brazilian government from taking land away from family-owned farms, showing the darker side of ethanol production.

## Discussion and Conclusion

Even from the passing of Pro-Alcool, you can see that both inside and outside forces combining together to jump-start the ethanol market. Without the combination of the first oil strike and the international sugar prices to be low enough where exportation is not profitable, there may have not even been a conversation about major conversions of sugar to ethanol, let alone a stronger ethanol mix within gasoline. However, no other nation in the world took the first oil crisis and figured the answer to that issue would be converting sugar, corn, or other renewable resource and converting it into ethanol. You have to credit the militaristic government in Brazil for taking action on a major issue no other nation took a chance on, even if it was originally a temporary agenda. They went out of their way to realize they have the capacity to grow enough sugar for both food and ethanol purposes. Brazil found a way to both stimulate a receding economy and provide jobs and economic growth to a large nation. Impressive feat for a militaristic government that struggled with the overall economic status.

Two other major outside forces allowed for the ethanol market to expand. The second oil strike convinced Brazil that Pro-Alcool would be put on as a “permanent,” program within Brazil. However, once oil prices dropped to considerable rates and the sugar market went back to a profitable export, less emphasis was focused in on ethanol. The change to a democratic form of government in 1985 put a negative spin on a renewable resource that was fueling both the economy and vehicles, leading to Pro-Alcool being disbanded in 1991. At this point the ethanol market seems to be doing fine without subsidies, and the government makes sure that there is a continuous market with the ethanol rates being set to be 20-25% in 1994.

While the market seems to have reached its peak, the introduction of the flex-fuel vehicle gives ethanol the needed boost to put a spark in 2003. While this is an outside force, this seems



to benefit the government, the people, and the auto industry. The allowance to choose the fuel you want right at the pump is a perk that revitalizes the ethanol industry into the strong market it is today. The Brazilian Government took advantage of a unique situation to produce ethanol, and I feel that they are the major key as to why they are one of the leaders of ethanol production today.

## Appendix

**Table 1: Opponents to adoption of Pro-Alcool**

Organization	Purpose of Organization	Relation to Pro-Alcool
Minister of Mines and Energy	Cabinet member responsible for industry for allocating energy throughout Brazil with the means within the country and importing what was necessary.	Shigeaki Ueki obviously did not want to take money to invest in a rival industry to oil supplies, and industry would find more oil sources in 1975.
The Bank of Brazil	National Bank of Brazil, dealing with international affairs and giving subsidies to organizations within Brazil.	Did not want to provide low interest loans for ethanol distilleries, and used their power to deter subsidies granted by the government.
Minister of Finance	The ministry is responsible for formulating and implementing the country's economic policy.	Felt that program would become inflationary and reduce capital for needed expansion.
Petrobras	An industry in Brazil that deals with energy co-operation among many nations.	Many attempts were made to derail Pro-Alcool, but ended up having to buy a set amount of ethanol each year, forcing their hand on a new industry and taking focus from their monopolized oil industry.

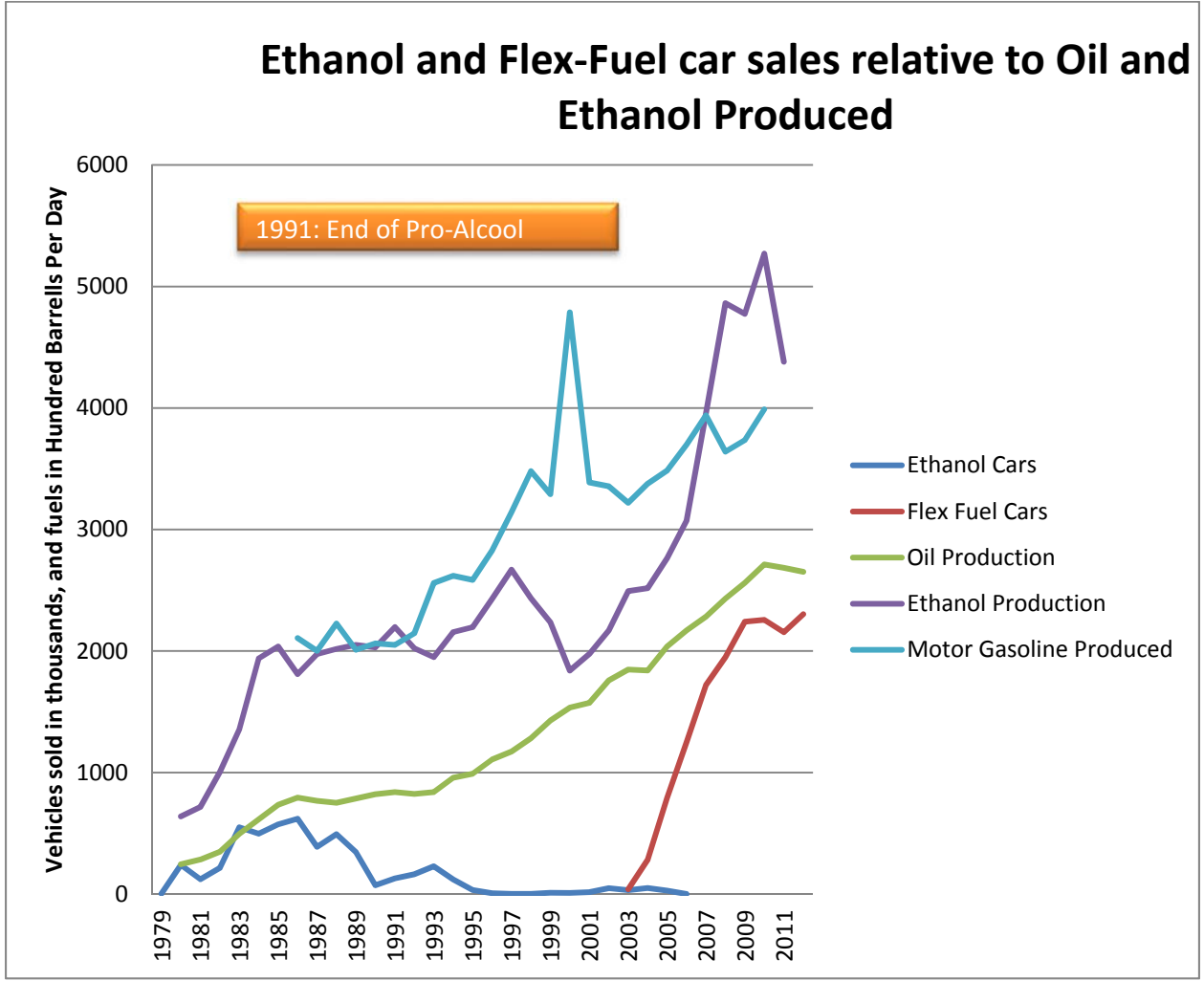
**Table 2: Pro-Alcool Original Supporters and Advocates**

Organization	Purpose of Organization	Relation to Pro-Alcool
Ernesto Geisel	President of Brazil from 1974-1979.	With Oil Shock of 1973, wanted to push for alternative option in case oil prices stay at a high level. Also saw that sugar was in high demand and was a primary crop in Brazil.
The Ministry of Industry and Trade (MIC)	Cabinet of Military Government that provided options for Brazil's Industry and Trade with other nations.	Pratini de Moraes proposed incentives for production of alcohol to be consumed as a fuel, taking pressure away from oil and creating new opportunities for the sugar industry.
The Ministry of Planning (SEPLAN)	Goal of SEPLAN was to make four year goals on Brazil's future on Government actions.	Planned that a temporary shift in sugar being used for ethanol would outweigh oil issues at the time, and planned for an impermanent use of ethanol.
The Ministry of Agriculture	The Ministry of Agriculture is responsible for the management of public policies to stimulate agriculture, the promotion of agribusiness and the regulation and standardization of services related to the industry	With the large amounts of sugar at hand, allowed for a new market for agriculture to expand and develop. Allowed for expansion of ethanol industry.
The Institute of Sugar and Alcohol (IAA)	Set prices, regulate, and import/export sugar and alcohol.	With the price drop in sugar in the early 1970's, Pro-Alcool was used as a tool to bail out the sugar industry for the time being, as Brazil had a major sugar amount at the time.
The Aerospace Technical Center (CTA)	Brazil's main producer of vehicular technology and production.	Given funds to make technology for ethanol-based vehicles, leading to production of otto-cycle internally combusted engines, which led to a push for a comprehensive national alcohol policy.
The Central Cooperative of Sugar and Alcohol of the State of Sao Paulo (COPERSUCAR)	The largest sugar and ethanol organization in Brazil, despite only being in Sao Paulo	Highly lobbied for Pro-Alcool, promised to adapt distilleries to produce ethanol. Were grateful for new market within their organization.
The Syndicate of the Alcohol Production Industry of the State of Sao Paulo, Rio de Janeiro and Espirito Santo	Organization that came about to put input on Pro-Alcool.	Pushed for adoption of Pro-Alcool, were excited for new opportunity and did their part to help raise support.
The Cooperative of Sugar and Alcohol Producers of the State of Rio de Janeiro (COPERFLU)	Goal was to better sugar and alcohol situation in the State of Rio de Janeiro	Aligned themselves with the IAA, favoring the installation of distilleries to solely produce alcohol.
Associations representing producers of other regions and the cane suppliers	Random organizations that supported Pro-Alcool.	Pushed for adoption of Pro-Alcool, were excited for new opportunity and did their part to help raise support.

**Table 3: Organizations Associated with Pro-Alcool  
Production until Disbandment in 1991**

Organization	Purpose of Organization	What they did
National Alcohol Commission (CNAL)	Created Solely to develop and coordinate Pro-Alcool	Helped get Pro-Alcool running with better credit programs and producing a national market, had trouble improving rural income levels. Would be disbanded on February 15 <sup>th</sup> , 1991.
The National Association of Automobile Manufacturers (ANFAVEA)	An entity that brings together the manufacturers of vehicles and agricultural machinery with industrial and production facilities in Brazil.	Helped push for more ethanol production when program was considered temporary in 1977, since they had the technology for ethanol-fueled vehicles. Would also produce flex-fuel vehicles that would expand ethanol usage.
National Executive Commission (CENAL)	Goal was to oversee ethanol production targets.	Helped pushed for subsidies and encouraged the auto industry to begin manufacturing alcohol vehicles. Would be disbanded on February 15 <sup>th</sup> , 1991.
CINAL	Inter-ministerial commission that would deal with more in depth issues within Pro-Alcool.	Guaranteed the purchase of ethanol against a certain price and set slightly higher than production cost for prices of ethanol. Continues today to deal with ethanol industry as a whole.
Copersucar Center of Technology (CTC)	Sugarcane Technology Center in Sao Paulo that's goal is to enhance technology of the sugarcane industry	Helped with the production of Ethanol vehicles, also has offered innovation and technology to sugarcane producers and processors in Brazil, helping with overall production of ethanol.
National Petroleum Council (CNP)	Council that handles what documents get implemented throughout Brazil, passes them, and gives own input on fuels within Brazil.	Approved of document sent their way and helped with ideas of implement process. Also responsible for overseeing alcohol prices. Was disbanded on February 15 <sup>th</sup> , 1991
Investialcool	An "agency for development" of the alcohol sector, used to lobby for alcohol legislation and provide capital for unfunded distilleries.	While accomplishing their purpose, also had a case where president Figueiredo declared that Investialcool could support a new alcohol sector, but not produce themselves, allowing the private sector to control alcohol, much to Petrobras dismay.
National Energy Commission	Goal was to create and develop an integrated energy strategy.	In July 1979, came up with three plans, one for oil importation, one to expand alcohol production, and an emergency plan. Went with alcohol production, pushed for ethanol cars, and teamed up with ANFAVEA to accomplish their goal.
Antonio Delfim Netto	Was head of National Monetary Council, Minister of SEPLAN, had a powerful influence on Government decisions.	Dealt with much of financing Pro-Alcool from 1979-1985 and inflation rates during that time.
Foreign Investors	Countries in Europe and the US who saw hope in Pro-Alcool	Gave one billion dollars to help fund Pro-Alcool, giving a big push for Brazil's economy and helped show they can be trusted as an investment
Interministerial Price Council	Deals with the cost and prices of Government-regulated goods within Brazil.	Helped regulate the price of alcohol to be competitive with the price of gasoline.

Figure 1



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