



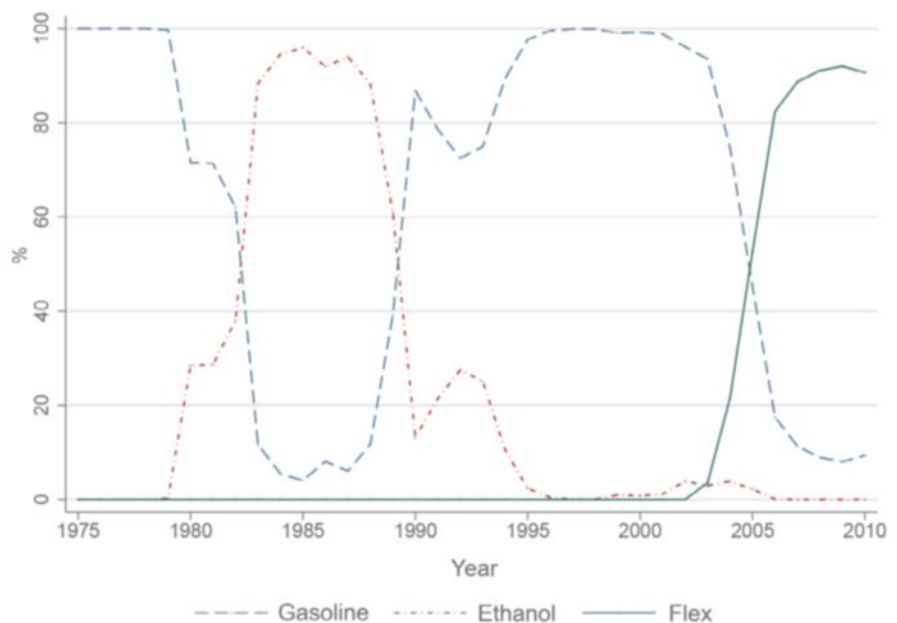
# BUILDING RESILIENCE IN BRAZIL'S BIOFUEL MARKET

New study shows increased flex-car fleet pays off at the pump for non-flex car drivers, highlighting how targeted climate policies can also lead to consumer benefits

As Brazil acts to reduce carbon emissions and achieve its Nationally Determined Contribution (NDC) goals under the 2015 United Nations Framework Convention on Climate Change (UNFCCC), a key strategy will be to build on the nation's strengths in biofuel.

Brazil is home to one of the largest and most successful biofuel programs in the world. The nation's energy mix consists of 40% renewable energy overall, which is three times the world average and qualifies Brazil as a low-carbon economy.<sup>1</sup> Brazil also enjoys one of the most developed flex-fuel markets in the world. Both gasoline and ethanol have been available for cars at virtually every fuel station in the country. Moreover, the penetration of flex-cars – ones that can run on any mix of gasoline or ethanol – reached 94% of all new cars registered in the country in 2008 (see Figure 1).

**Figure 1:** Registration of New Cars by Fuel Type



**Note:** Figure 1 shows shares (in percentage) of new car registrations by fuel type. Diesel and electric cars are not included in the calculations.

**Source:** Anfavea

1 Source: <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Brazil/1/BRAZIL%20iNDC%20english%20FINAL.pdf>

Under the NDC, Brazil pledged to increase the share of sustainable biofuels in the nation's energy mix through the expansion of biofuel consumption and by increasing the ethanol supply.

Brazil has a promising foundation for both of these targets. The success of the flex fuel industry caused ethanol demand to surge and drove the sugarcane industry. Between 2005 and 2012, the sugarcane production area rose by 70% and forecasters expect this expansion will continue over the next ten years, rising by as much as an additional 37% in the nation overall.

This brief is based on a new study by researchers at Climate Policy Initiative (CPI), PUC-Rio and Fundação Getulio Vargas that suggests that **as policymakers pursue these targets, the unintended benefits of growing the alternative fuel market may be more broad-reaching than originally understood.**

The analysts examined the retail fuel market, where flex cars have allowed consumers to treat gasoline and ethanol as nearly perfect substitutes at the pump. They found that a 10-percentage point increase in the market share of flex cars reduced ethanol prices by approximately eight cents of Brazilian reais, and, in many instances, reduced gasoline margins by two cents of Brazilian reais. This means that gasoline-fueled car owners benefited at the pump similarly to flex-car owners.

This evidence suggests that technologies that benefit the environment and increase consumer choice **may also benefit even those consumers who choose not to adopt them, an encouraging sign for Brazil's expanding biofuel market.**

### **About the study**

The study focused on the penetration of flex cars and their impact on the retail fuel market in the state of Rio de Janeiro. Using weekly retail pricing data at the station level, they examined the impact on retail prices and margins, the price spread between gasoline and ethanol, and the correlation between gasoline and ethanol prices.

The researchers found that as flex car penetration increased, the degree of substitution between ethanol and gasoline rose, thereby reducing the prices in both markets. Based on the 2007 size and sales of the flex car fleet, the researchers roughly estimate that Brazilian consumers saved as much as 70 million Brazilian reais (the equivalent of approximately 36 million dollars) at the pumps in Rio de Janeiro that year. The findings also show that the retail price gap and the retail price correlation between the two fuels also increased with the adoption of the flex cars. Thus, the benefits of an expanded ethanol industry reached even those consumers who drive cars fueled solely by gasoline.

The analysts observe that the rise of flex cars is a key channel for improving consumer benefits and should be taken into consideration by policymakers, especially when they consider expanding production and markets for alternative fuels, such as hydrogen and electricity.

As Brazil sets course for achieving its NDC and continues its transition away from fossil-fuel use, policymakers can continue to build on the strong foundations of the biofuel industry with greater confidence based on these findings.

## Source

“Flex Cars and Competition in Fuel Retail Markets”  
Working Paper, 2016.

## Authors

### **Juliano Assunção**

Climate Policy Initiative (CPI) & Department of Economics, PUC-Rio  
juliano.assuncao@cpirio.org

### **João Paulo Pessoa**

São Paulo School of Economics & the Centre for Economic Performance  
joao.pessoa@fgv.br

### **Leonardo Rezende**

Department of Economics, PUC-Rio  
lrezende@econ.puc-rio.br

## Media Contact

### **Mariana Campos**

mariana.campos@cpirio.org

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*Climate Policy Initiative (CPI) works to improve the most important energy and land use policies around the world, with a particular focus on finance. We support decision makers through in-depth analysis on what works and what does not. CPI's Brazil program - Núcleo de Avaliação de Políticas Climáticas - partners with the Pontifical Catholic University of Rio de Janeiro and focuses on a Production and Protection approach to land use. <http://climatepolicyinitiative.org/>*