

BRAZILIAN SUGARCANE INDUSTRY ASSOCIATION  
UNIÃO DA INDÚSTRIA DE CANA-DE-AÇÚCAR



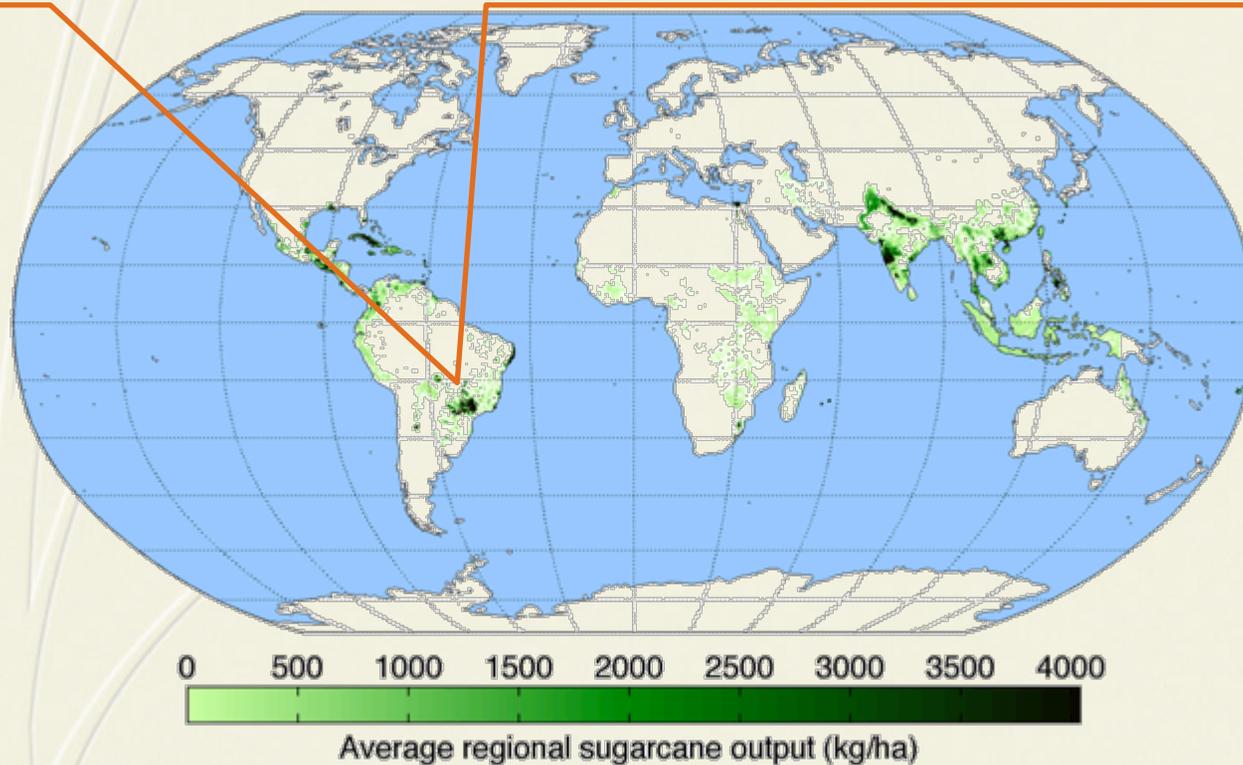
# Brazilian Sugarcane Ethanol in California

*Potential Growth Projection and Outlook for Exports*

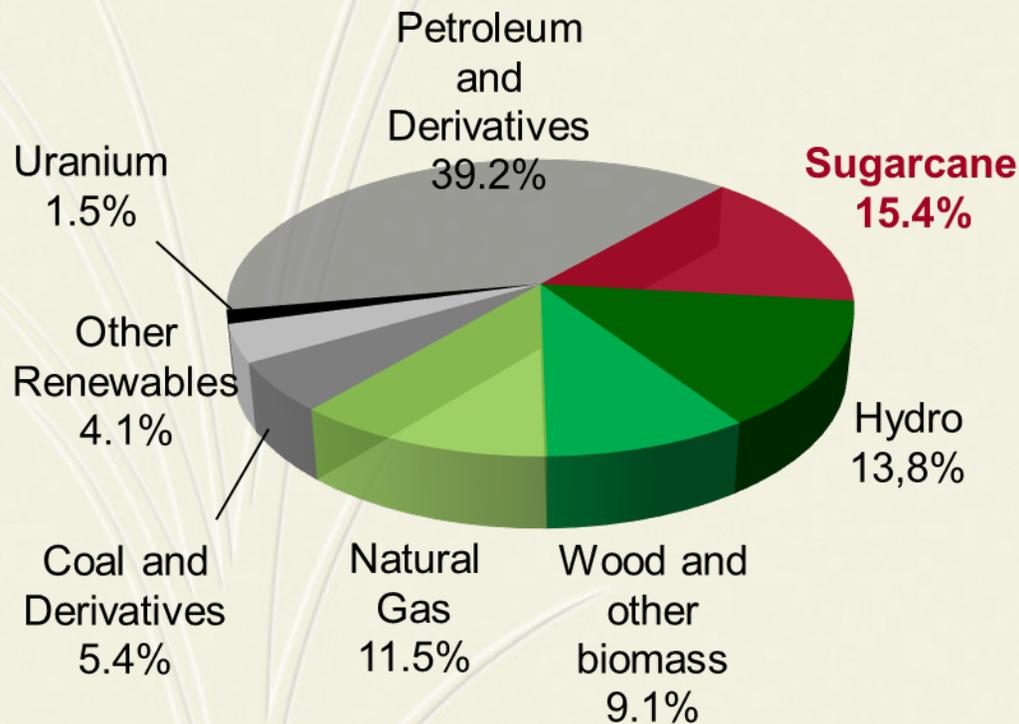
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# BRAZIL IS #1 IN SUGARCANE

- ✓ Brazil is the **world's largest cane producer**, twice #2 India
- ✓ Brazil's **South-Central region** accounts for **90%** of country's cane harvest
- ✓ Brazil's sugarcane sugar yields have grown at **3% CAGR** since late 1970s



# CANE IS #1 RENEWABLE ENERGY IN BRAZIL



- ❖ Renewable energy represents **42.4% of Brazil's energy** mix.
- ❖ Sugarcane is Brazil's **#1 source of renewable energy** (ethanol + bioelectricity), the second overall only behind petroleum.
- ❖ **Almost 80% of all power generation is hydro-based** but marginal electricity supply growth is critical focus now.

# UNICA SPEAKS FOR BRAZILIAN INDUSTRY

UNICA is the leading sugarcane industry association, representing over 130 producers and mills and responsible for 60% of all ethanol and sugar production in Brazil.



**SUGAR**  
38 Million Tons

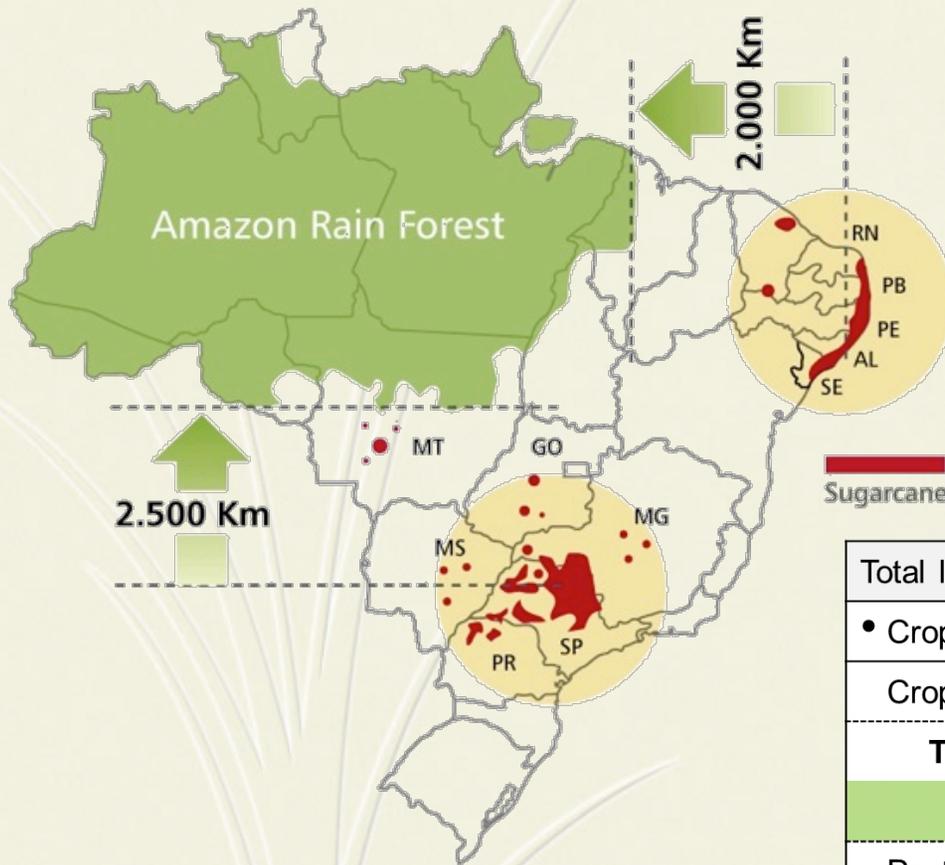


**ETHANOL**  
6 Billion Gallons



**ELECTRICITY**  
16,000 GWh

# UNICA SPEAKS FOR BRAZILIAN INDUSTRY



*Sugarcane occupies 1% of Brazil's total land to produce almost 600 million tons per crop year*

	Million hectares	% of the Brazilian territory
Total land area	852	
• Crop and pasture land	258	30%
Crop land	60	7%
<b>Total sugarcane area</b>	<b>9.5</b>	<b>1%</b>
<b>Sugarcane area for ethanol</b>	<b>4.6</b>	<b>0.5%</b>
Pasture land	198	23%
• Native Vegetation	554	65%
• Other Uses	40	5%

1 Hectare = 2.5 acres

Source: UNICA, CONAB, IBGE. For the figures on land use: Institute for International Trade Negotiations – ICONE; The Brazilian Institute of Geography and Statistics – IBGE (PAM 2010 and Censo Agropecuário 2006); Brazilian Ministry of the Environment – MMA; National Institute for Space Research - INPE (TerraClass) and Agricultural Land Use and Expansion Model Brazil Ag-LUE-BR (Gerd Sparovek, ESALQ/USP). Produced by UNICA.



# POLICIES TO ENSURE SUSTAINABLE GROWTH

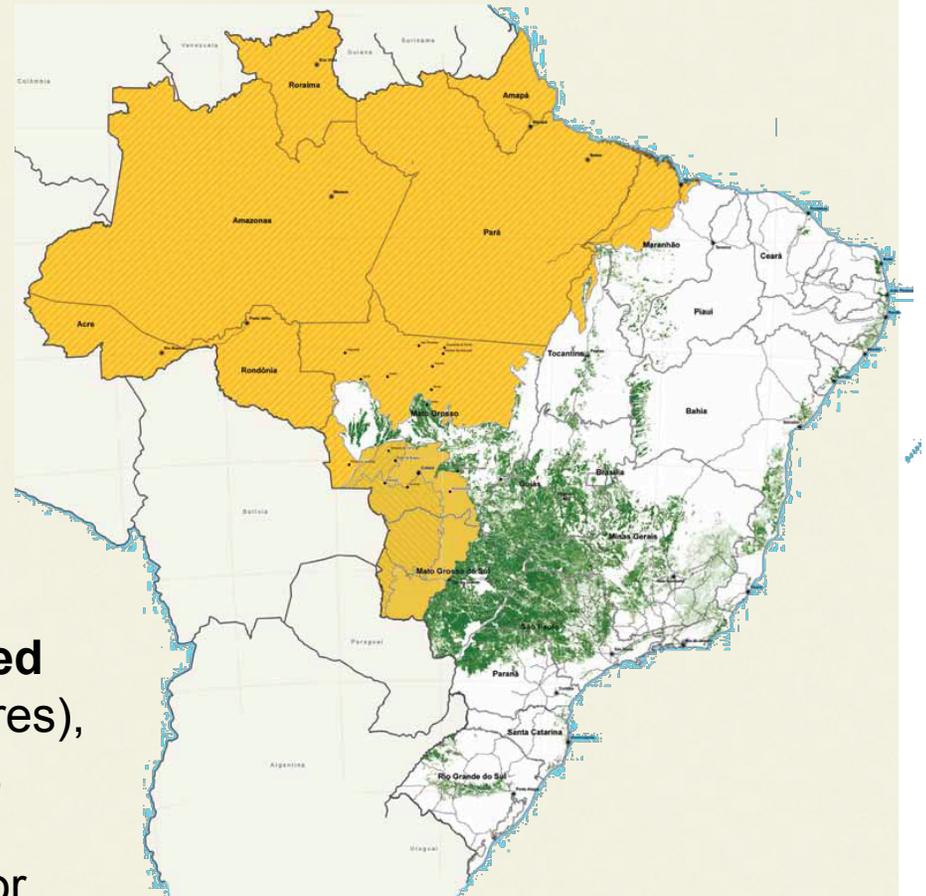
At UNICA's urging, the Federal Government has implemented regulations that:

- Excludes sugarcane plantation in **sensitive biomes** such as the Amazon forest and Pantanal wetlands.
- Excludes sugarcane cultivation on **native vegetation** (e.g., cerrado, grasslands)

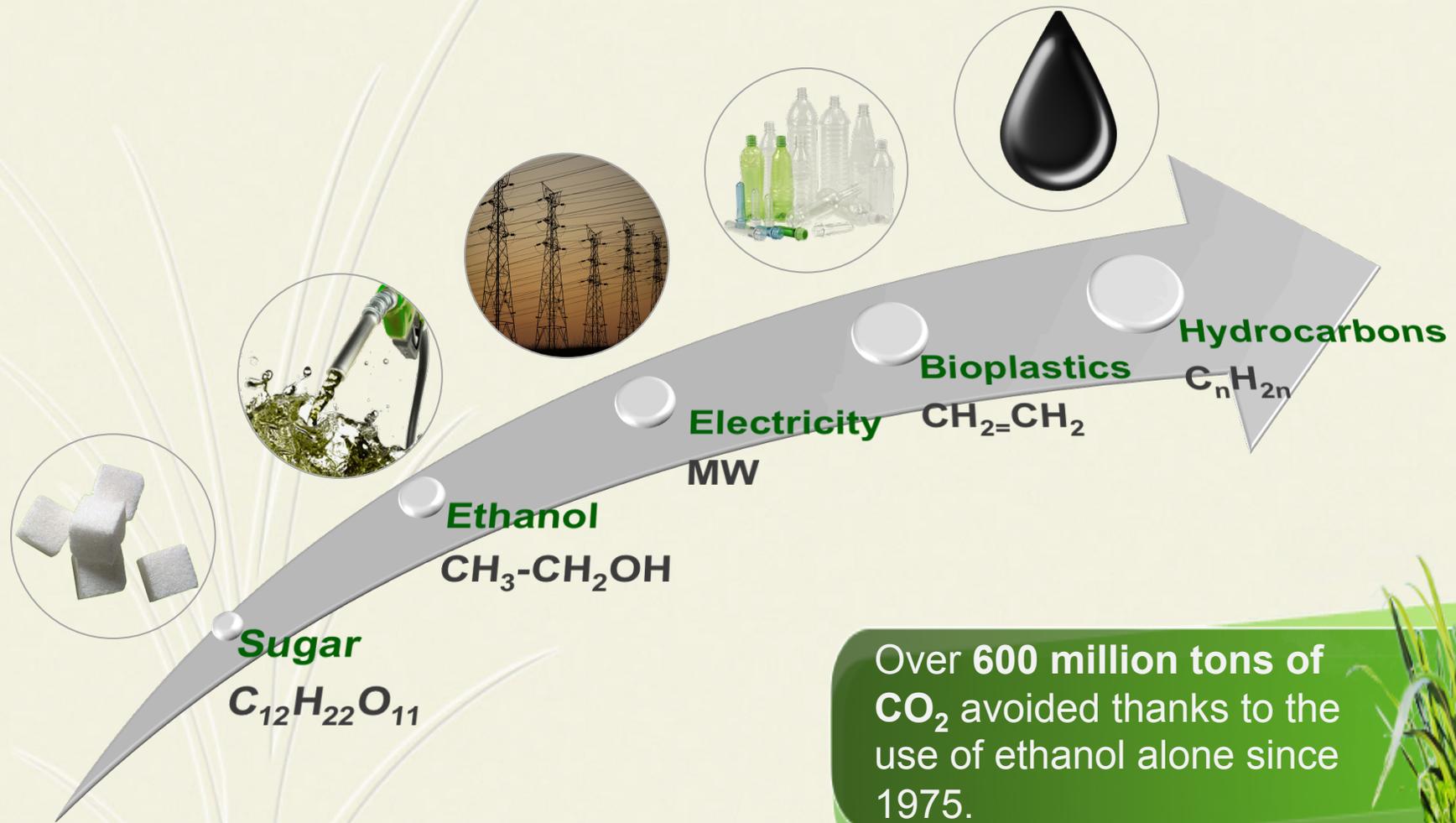
EMBRAPA undertook **satellite mapping** exercise and identified **areas suitable for sugarcane production** based on environmental, economic and social criteria.

Result is that **sugarcane expansion is allowed on about 65 million hectares** (160 million acres), which is equivalent to 7.5% of Brazil's territory.

Today about 1% of Brazil's total land is used for sugarcane – food, ethanol and electricity.



# PRODUCTS SUGARCANE MAKES POSSIBLE



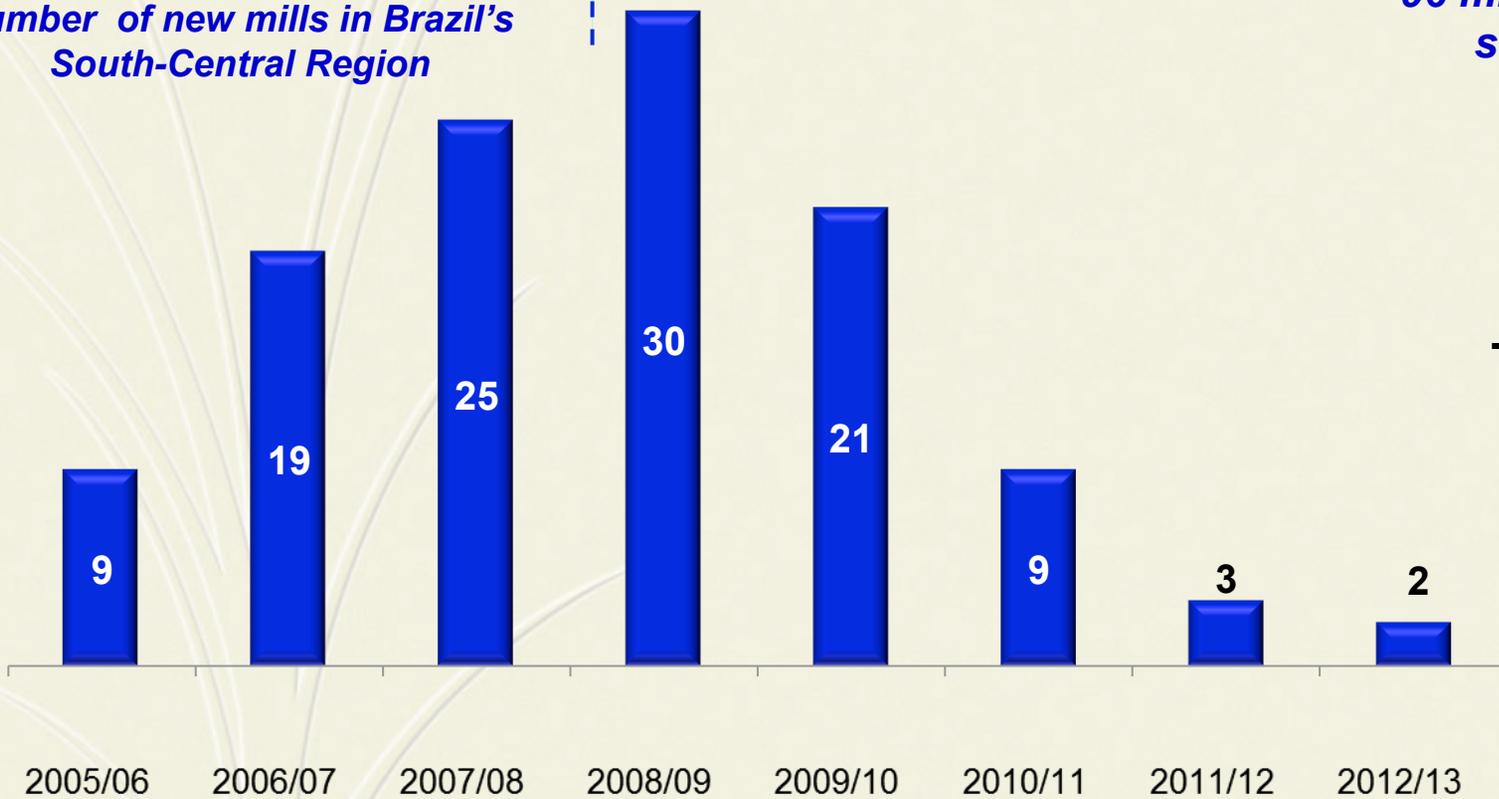
# MAJOR STRUCTURAL CHANGES

- ***Investments change focus: from building new mills to purchasing brownfields – consolidation***
- *Strong M&A Activity involving nearly 150 MM Ton*
- ***Renewed effort to optimize production and sales: investments in logistics, technology, agricultural and industrial structures***

# NUMBER OF NEW SUGARCANE MILLS IN BRAZIL

*Number of new mills in Brazil's South-Central Region*

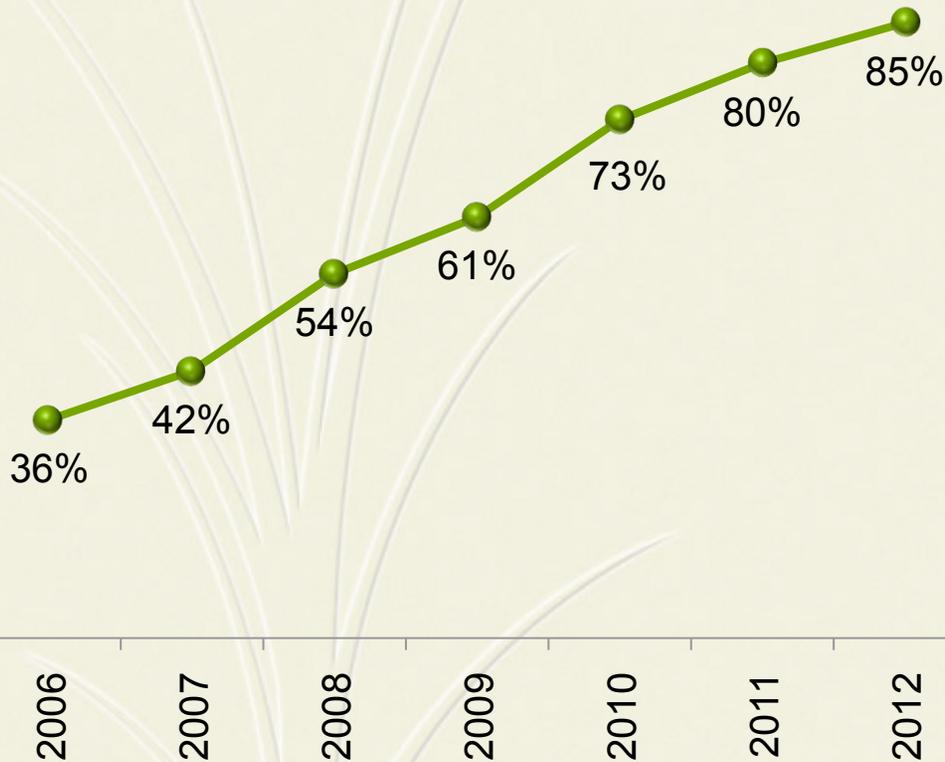
*Sugarcane crushed in 2012/2013 harvest year:  
96 million tons of sugarcane*



→ ?

# INCREASE IN MECHANIZED HARVESTING IN SOUTH-CENTRAL BRAZIL

Share of cane fields harvested mechanically



Mechanized harvesting of more than 4 million hectares between 2006 and 2012

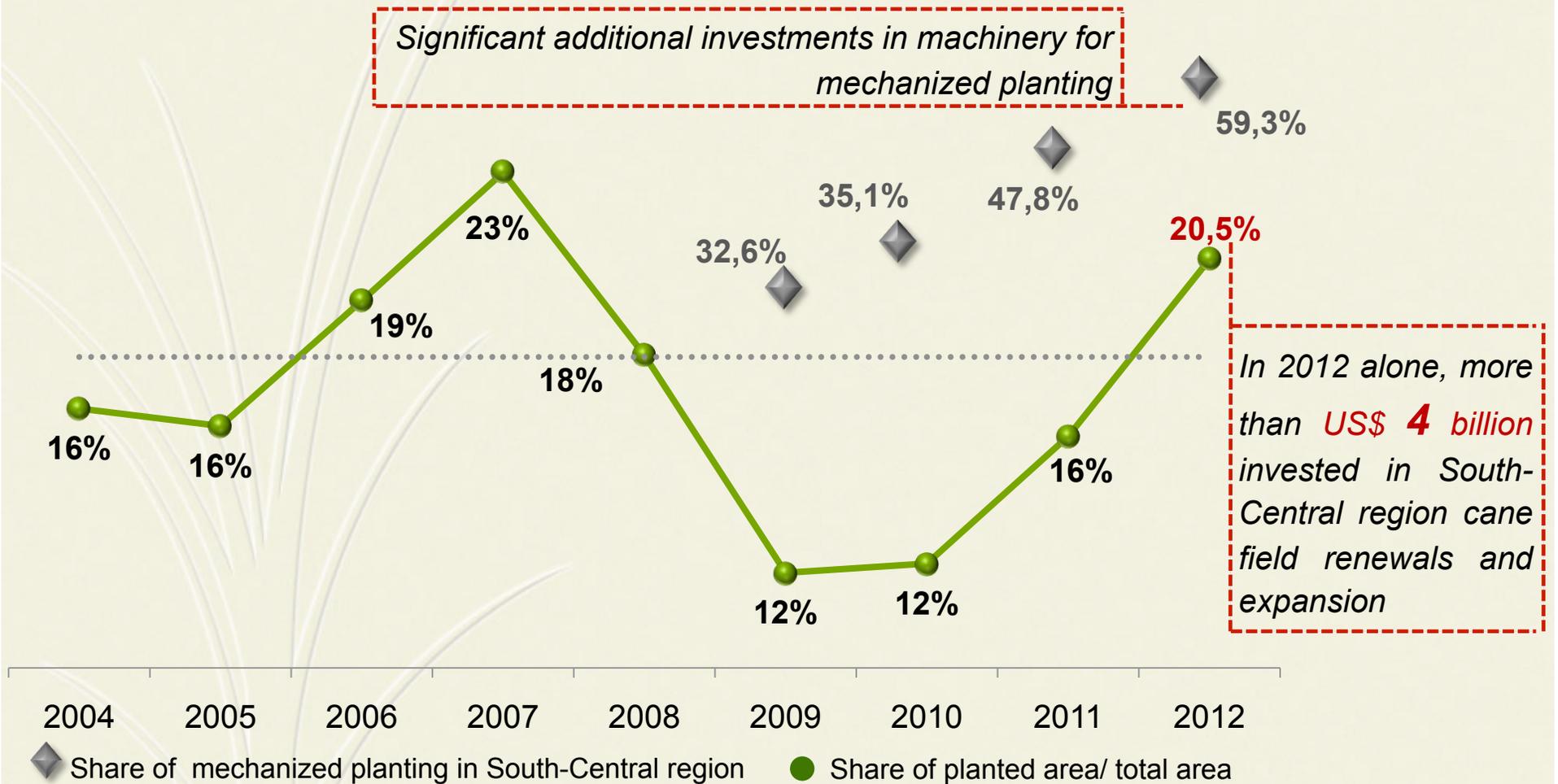
Mechanization demanded:

- ✓ 5,700 trucks and trailers
- ✓ 3,400 harvesters
- ✓ 13,600 trolleys
- ✓ 6,800 tractors

Total equipment purchases:

**US\$ 4.5 billion** (in current prices)

# IMPROVED CANE FIELD RENEWAL RATE... ... WITH INCREASED MECHANIZED PLANTING



# LOGISTICS FOR ETHANOL DISTRIBUTION AND EXPORTS ALSO TARGETED WITH NEW INVESTMENTS



## Extension:

- ✓ Pipeline: **1,261** km
- ✓ Waterways: **750** Km
- ✓ Covers **five** Brazilian states and **45** municipalities

## Transport capacity:

~ **20** billion liters/year

## Estimated investments to 2017

US\$ **3.5** billion

*Estimated reduction in logistics-related costs ranges  
form **20%** to **30%** to 2015*

The background of the slide is a close-up photograph of several sugarcane stalks, showing their characteristic ribbed texture and green color. The stalks are arranged vertically, with some in the foreground and others receding into the background, creating a sense of depth. The lighting is soft, highlighting the natural patterns on the cane leaves.

# Current Projections

## *Cane Ethanol Exports*

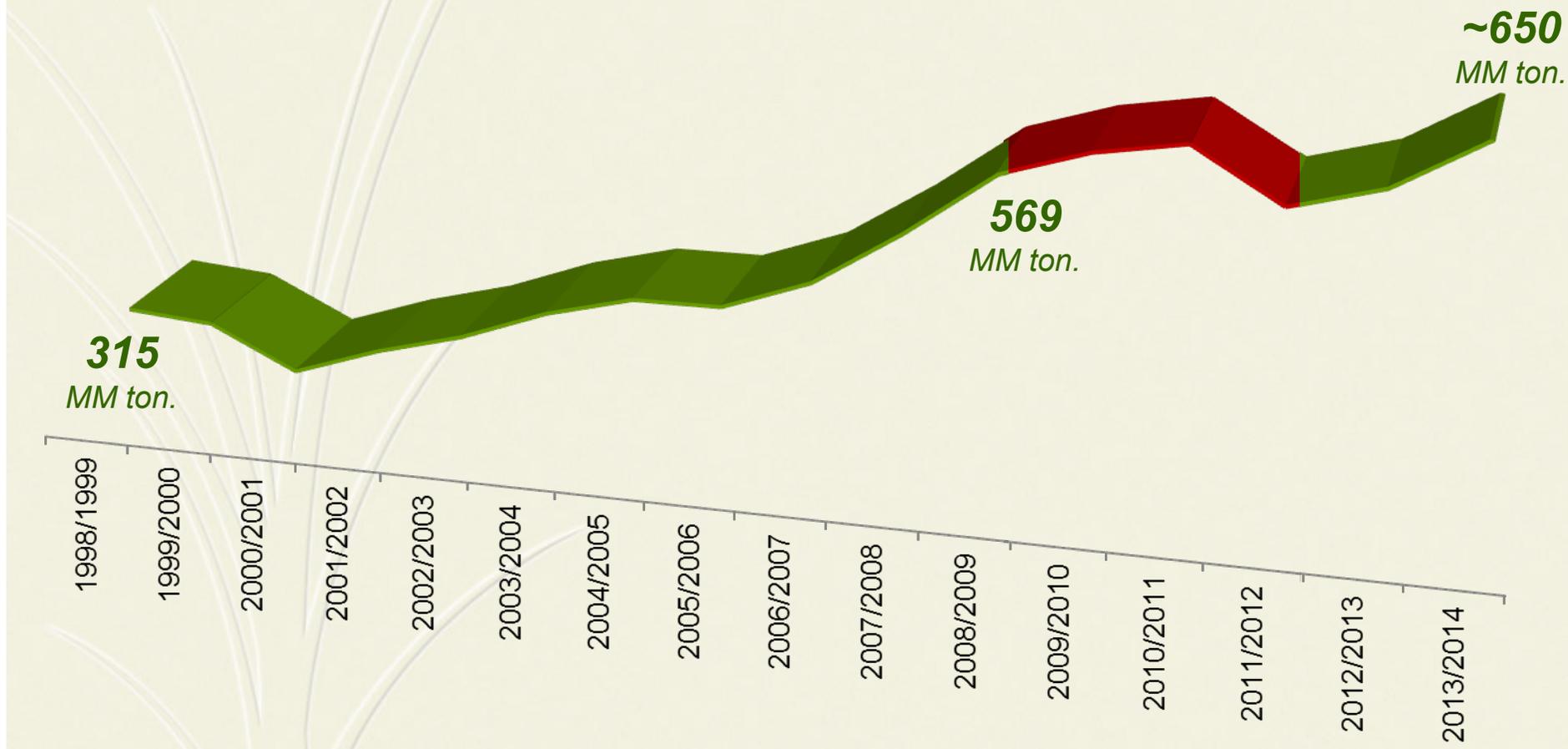
## WHAT UNICA PROJECTED IN 2010

	2009/10	2015/16	2020/21
<b>Sugarcane production (million tons)</b>	<b>602.19</b>	<b>829</b>	<b>1,038</b>
<b>Sugar (million tons)</b>	<b>32.96</b>	<b>41.3</b>	<b>45.0</b>
Domestic Market and Stocks	8.87	11.4	12.1
Export	24.09	29.9	32.9
<b>Ethanol (billion gallons)</b>	<b>6.79</b>	<b>12.4</b>	<b>17.2</b>
Domestic Market and Stocks	5.95	9.2	13.1
Export	0.84	3.2	4.1
<b>Bioelectricity (MW average)</b>	<b>1,800</b>	<b>8,158</b>	<b>13,158</b>
Share of electricity demand (%)	3%	11%	14%

*Note: e = estimated data; potential generation of surplus electricity has been calculated based on the utilization of 75% of the available bagasse and 50% of the available straw, and considering the sugarcane production during most recent harvest, Sources UNICA, Copersucar, and Cogen.*

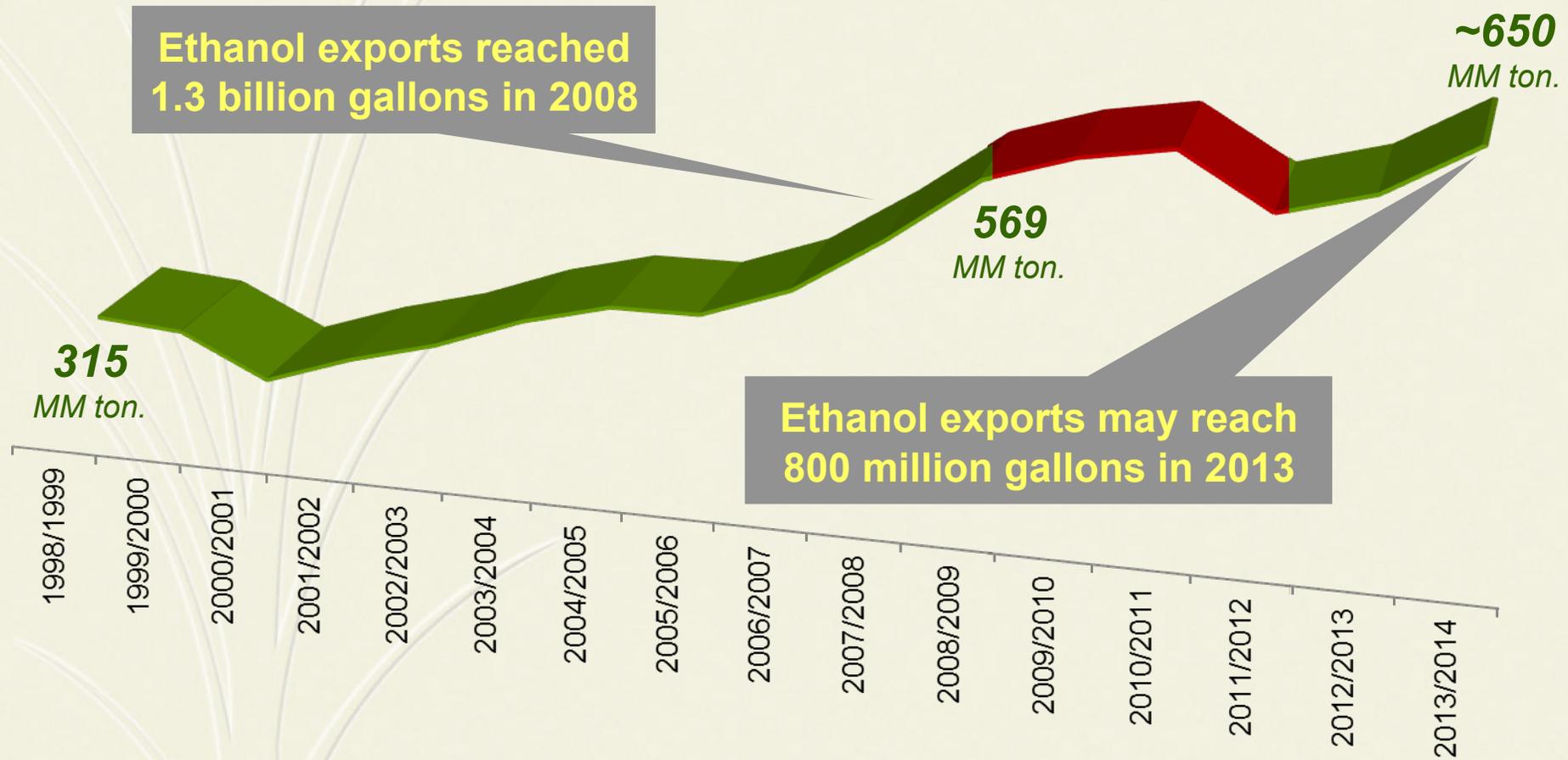
# CHANGES TO THE OUTLOOK

*Sugarcane Processed in Brazil (1998 to Present)*



# CHANGES TO THE OUTLOOK

## Sugarcane Processed in Brazil (1998 to Present)



# WHAT DRIVES CANE ETHANOL DEMAND

- Until now, sugarcane ethanol demand is driven by domestic demand, namely flex-fuel vehicles (FFVs).
  - FFVs account for half of Brazil's passenger car fleet and growing.
  - Consumers know to use ethanol in FFVs when ethanol is priced no more than 70% of gasoline (E25).
  - Nearly all FFVs opted for ethanol in 2009 but considerably less today.
- Government policy to maintain gasoline prices flat for last seven years led to a migration back to gasoline.
  - Brazil is estimated to be subsidizing gasoline by over \$0.50 per gallon
  - This domestic market distortion constrains ethanol production capacity growth.
- Even without change in government policy, the industry will need to grow to maintain demand at home and abroad.

# WHAT UNICA IS PROJECTING TODAY FOR THE SOUTH-CENTRAL REGION'S 2013/2014 SUGARCANE HARVEST

	2013/2014
<b>Sugarcane production (million tons)</b>	589.6
<b>Sugar (million tons)</b>	35.5
Domestic Market and Stocks	9.7
Export (available for export)	25.8
<b>Ethanol (billion gallons)</b>	6.7
Domestic Market and Stocks	6.0
Export	0.7

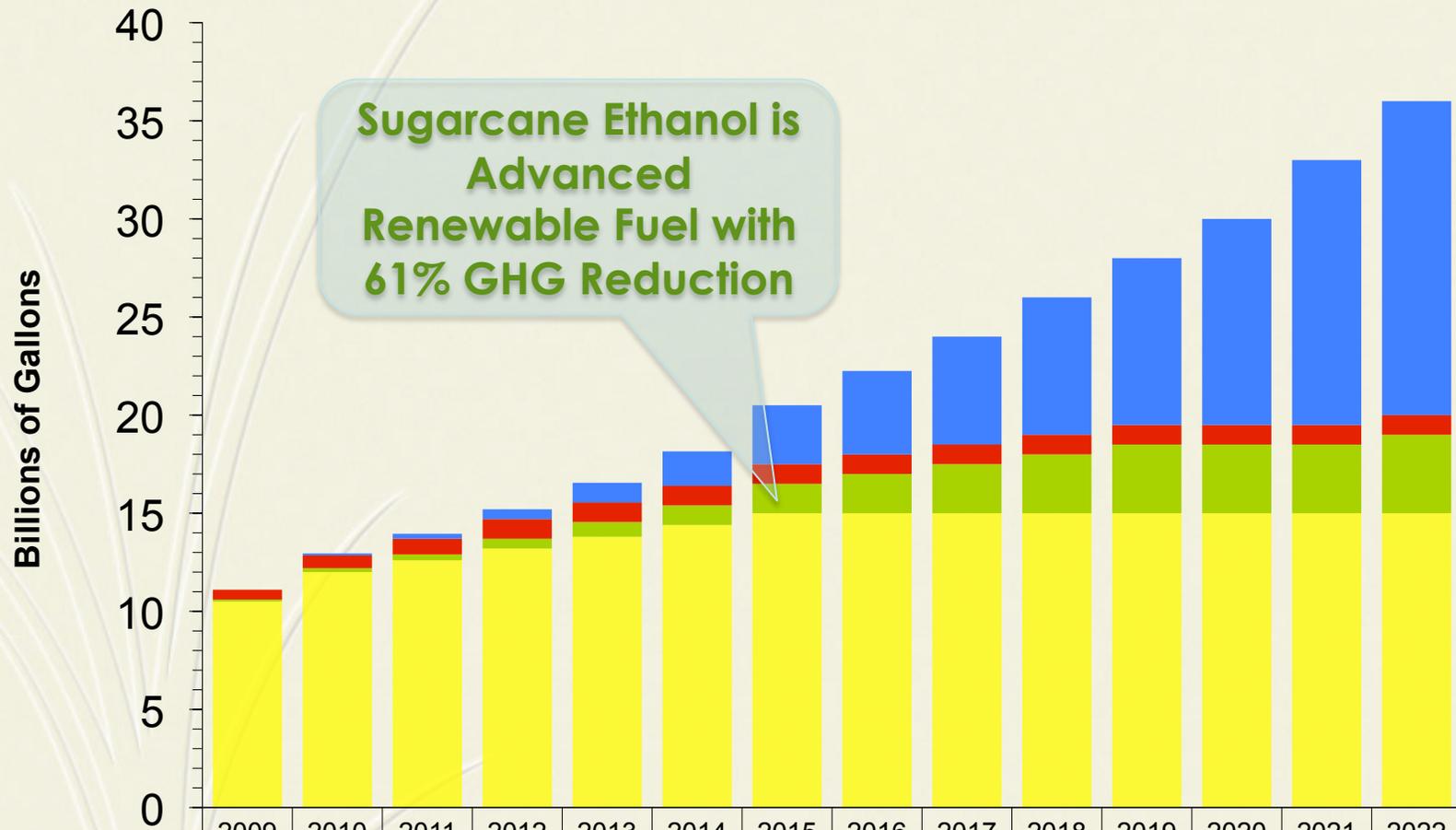
Source: UNICA Note: estimate released on April, 2013.

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# Sugarcane's Advanced Biofuels

## *Cane Ethanol in the RFS and the LCFS*

# U.S. RENEWABLE FUELS STANDARD (RFS-2)



Sugarcane Ethanol is  
Advanced  
Renewable Fuel with  
61% GHG Reduction

LOWER  
GHG

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
■ Celulosic Advanced		0.10	0.25	0.50	1.00	1.75	3.00	4.25	5.50	7.00	8.50	10.50	13.50	16.00
■ Biomass-based Diesel	0.50	0.65	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
■ Non-celulosic Advanced	0.10	0.20	0.30	0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50	3.50	3.50	4.00
■ Conventional Biofuels	10.50	12.00	12.60	13.20	13.80	14.40	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00

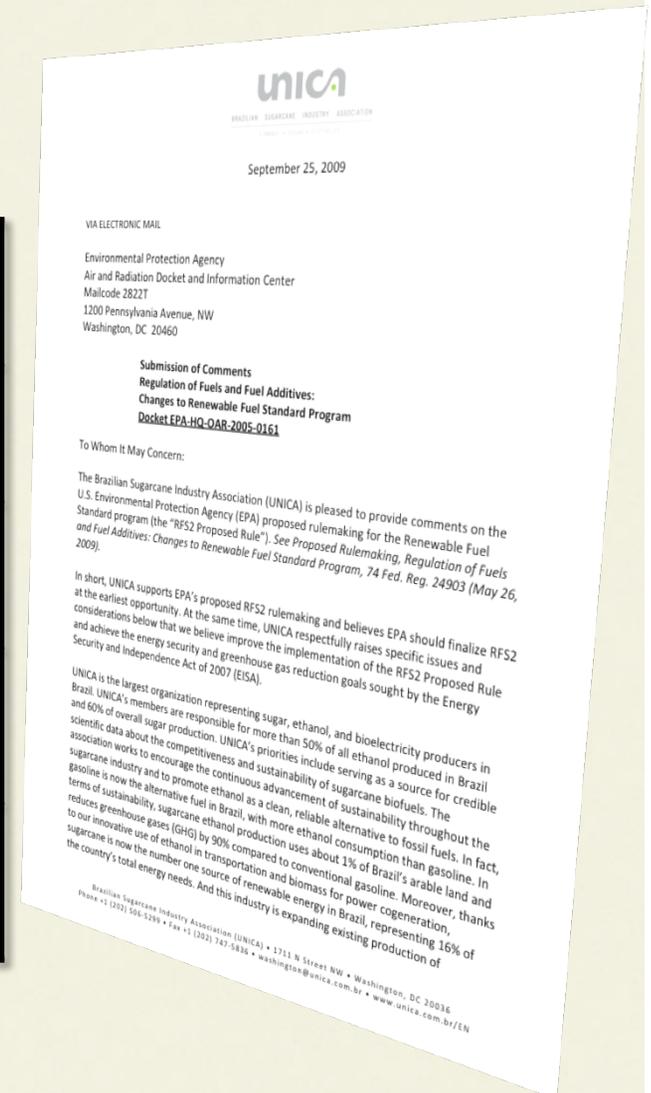
Source: EISA of 2008, U.S. Environmental Protection Agency (RFS-2) Final Rule.



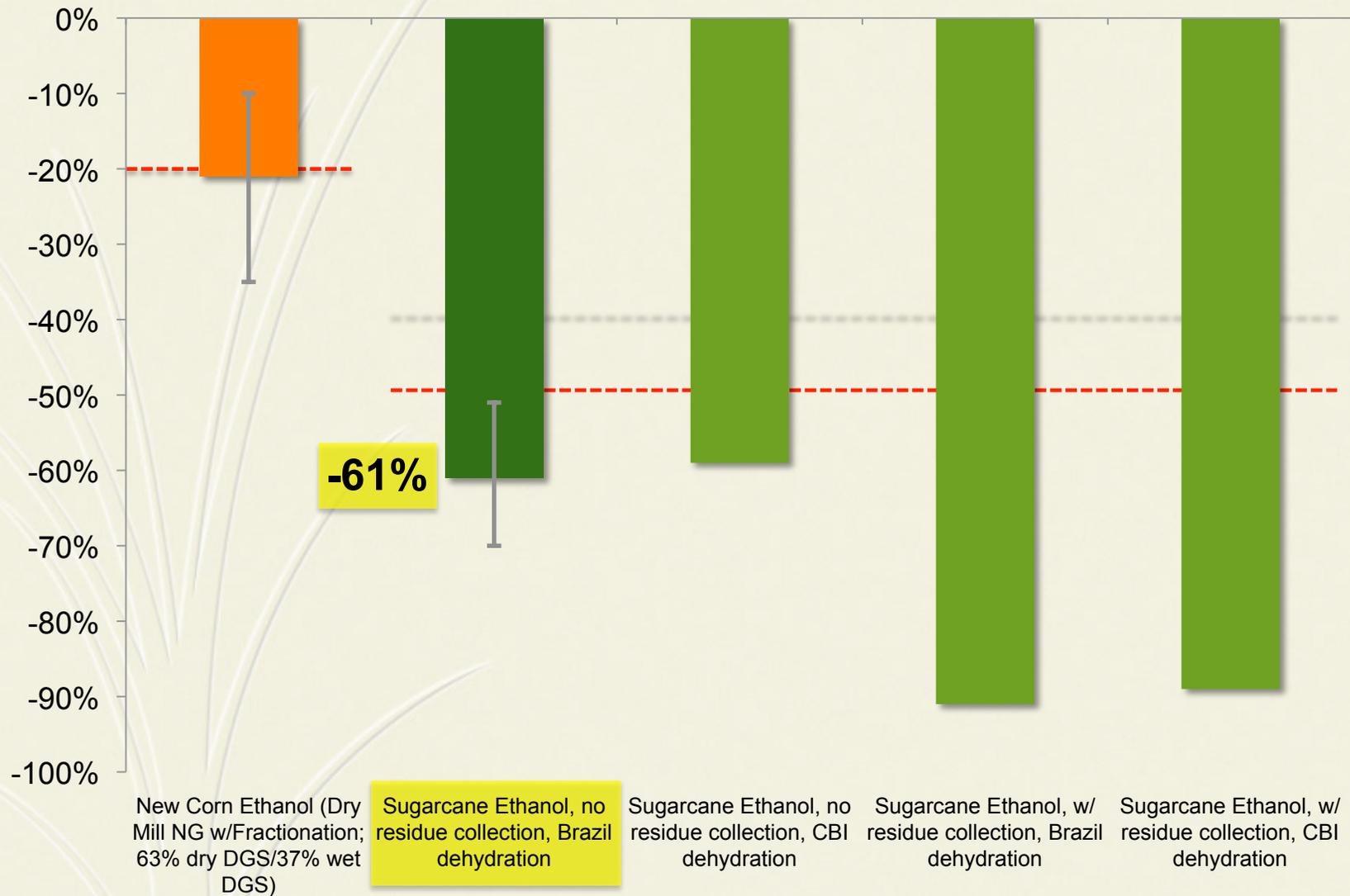
# WHAT UNICA TOLD EPA...

While we were pleased with results of EPA's rulemaking, we believe that GHG reduction – *even including ILUC* – is still better than 61%...

	<b>100 years 2% Discount</b>	<b>30 years 0% Discount</b>
EPA Proposed Rule	-44%	-26%
Brazilian Regional Land Use Modeling	-64%	-52%
Recognizing Carbon Uptake of 17tC/ha	-69%	-60%
Emission Credits for Cogeneration	-82%	<b>-73%</b>



# EPA RFS RESULTS



Source: U.S. Environmental Protection Agency (RFS-2) Final Rule;



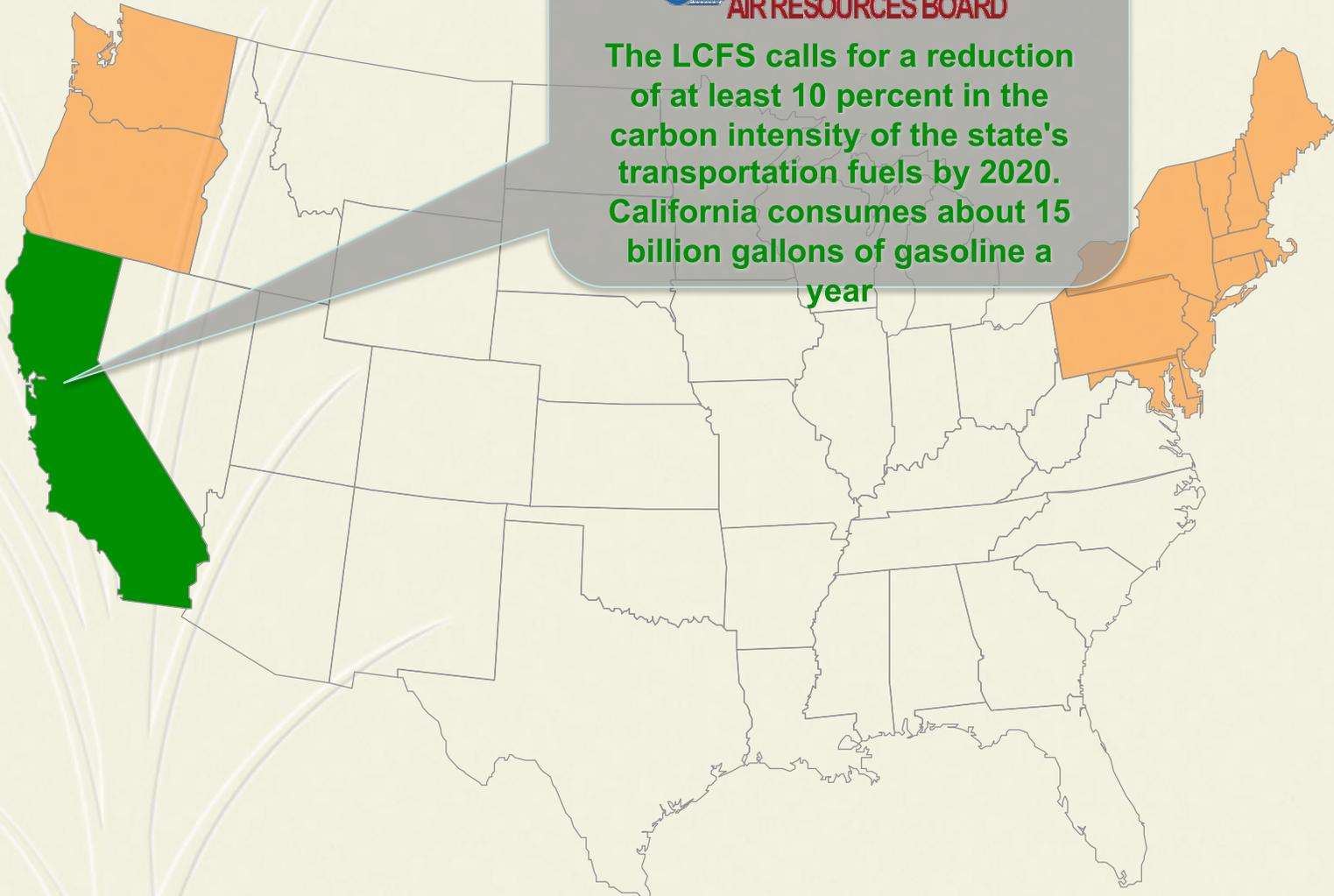
# CALIFORNIA'S LOW CARBON FUEL STANDARD



California Environmental Protection Agency

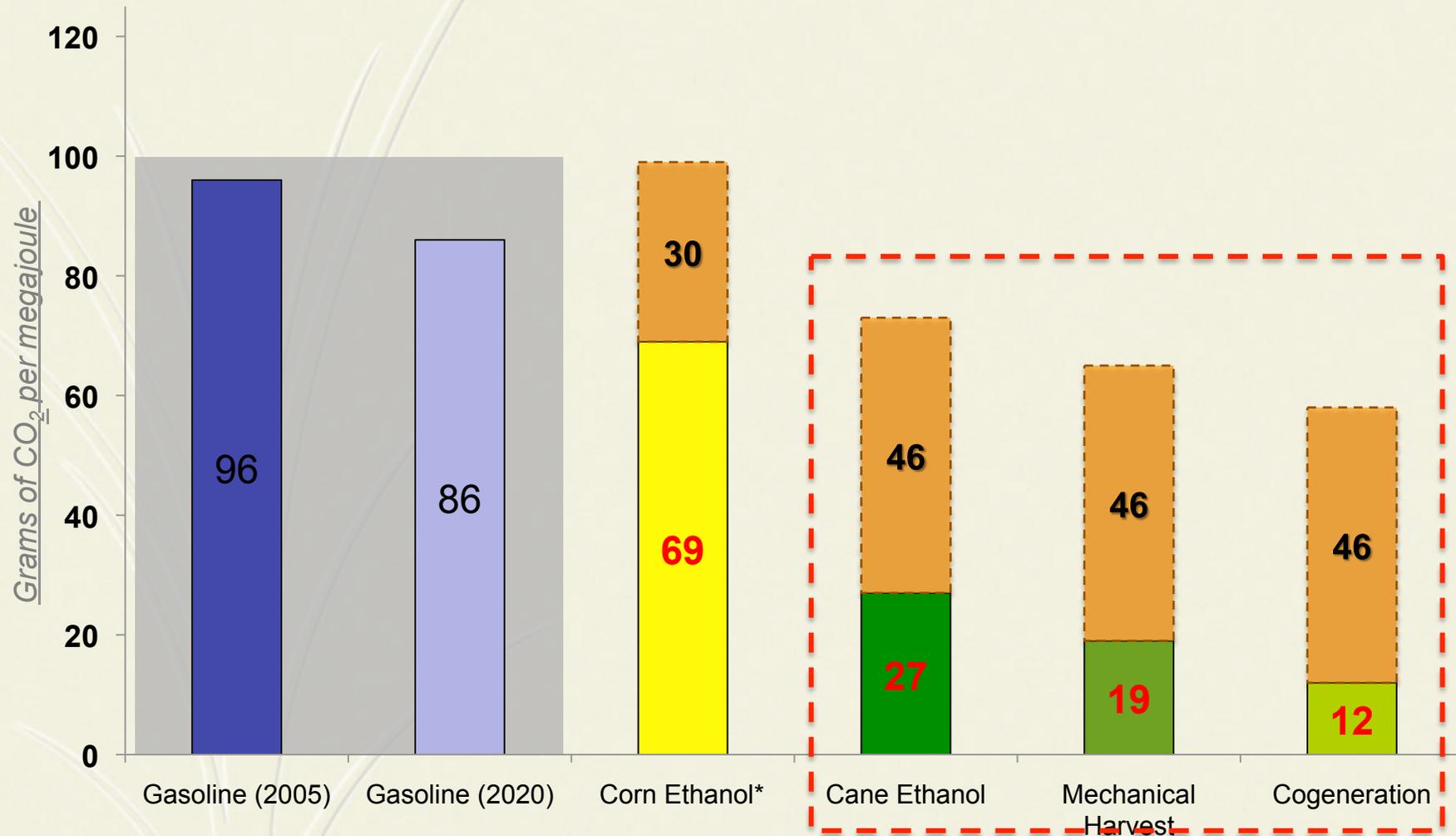
**AIR RESOURCES BOARD**

The LCFS calls for a reduction of at least 10 percent in the carbon intensity of the state's transportation fuels by 2020. California consumes about 15 billion gallons of gasoline a year



# LCFS WITH INDIRECT LAND USE PENALTY

*Despite Modeling Errors, Sugarcane Ethanol is Lowest Carbon Liquid Fuel*



Fonte: California Air Resources Board's Low Carbon Fuel Standard.

# LCFS SIMULATION WITH SUGARCANE ETHANOL

*Even with ILUC, 10% sugarcane ethanol blends meet LCFS to 2017*

