

# **INDIRECT LAND USE CHANGE, LOW CARBON FUEL STANDARDS, & CAP AND TRADE: The Role of Biofuels in Greenhouse Gas Regulation**

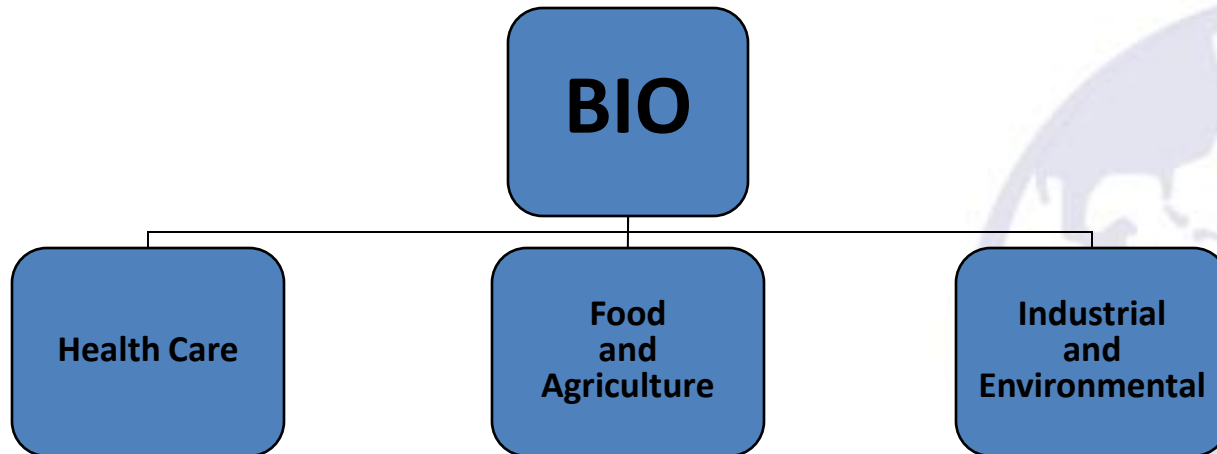
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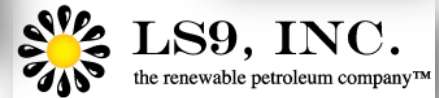
24 August 2009

# What is BIO?

- Biotechnology Industry Organization (BIO)
- Trade association based in Washington, D.C.
- Over 1,200 member companies
- Members in U.S. and 31 other countries



# SOME INDUSTRIAL AND ENVIRONMENTAL SECTION MEMBERS



# FRAMING THE ISSUE

## ASSERTIONS:

- Biofuels have the potential to play a critical role in addressing climate change
- Details of public policies intended to reduce GHG emissions will be the primary determinant of the extent of that role



# INDIRECT LAND USE CHANGE

## Crux of Biofuels Policy

ILUC is the issue that will determine the impact of GHG policies on biofuels...

- Renewable Fuel Standard (RFS)
- Low Carbon Fuel Standard (LCFS)
- Carbon Cap and Trade

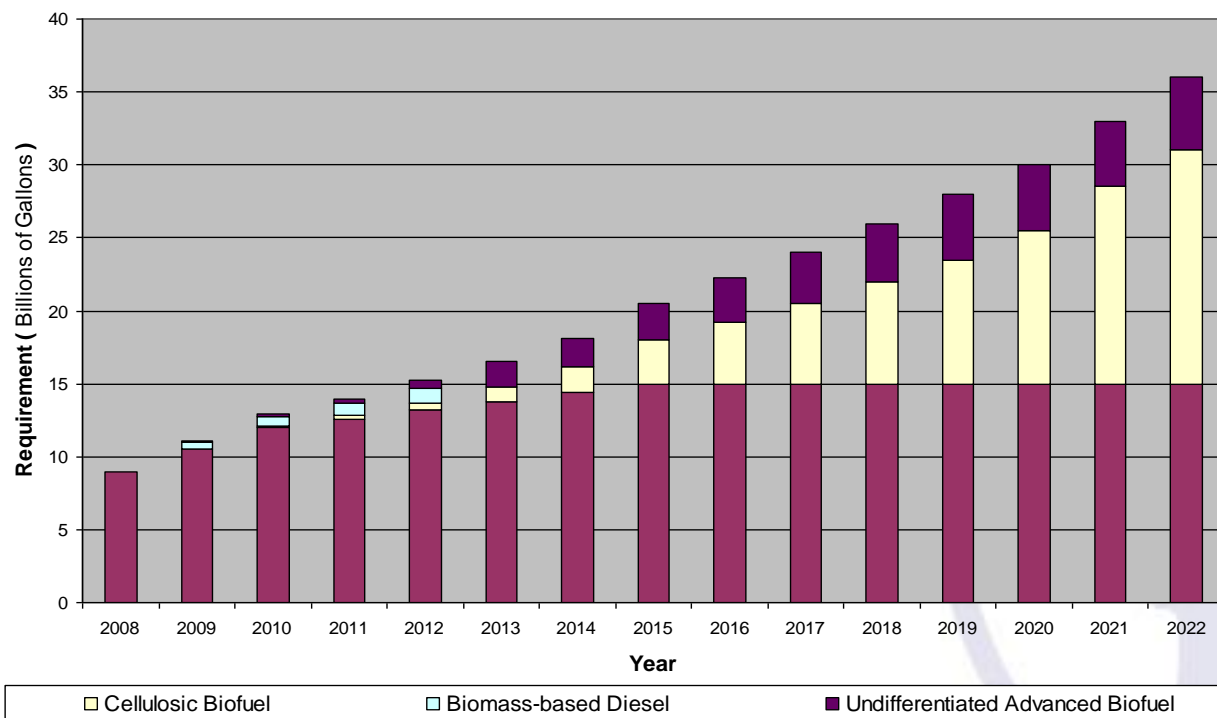
... and yet there is nothing in US Federal Statute that defines ILUC.



# FEDERAL RENEWABLE FUEL STANDARD

2007 Energy Bill (EISA) imposes first ever federal GHG performance requirement for any product – biofuels – in revisions to federal Renewable Fuel Standard (RFS).

## EISA Renewable Fuels Standard



# FEDERAL RENEWABLE FUEL STANDARD

## EISA RFS GHG Requirements

- Section 202(a)(1)
  - “The [EPA] Administrator shall...ensure that...any such renewable fuel produced from new facilities that commence construction after the date of enactment of this sentence *achieves at least a 20 percent reduction in lifecycle greenhouse gas emissions compared to baseline lifecycle greenhouse gas emissions.*”
  - Advanced biofuels (50 percent) and cellulosic biofuels (60 percent) require even greater improvements over baseline.

# FEDERAL RENEWABLE FUEL STANDARD

## EISA definitions:

- **Baseline lifecycle greenhouse gas emissions**
  - “Average lifecycle greenhouse gas emissions, as determined by the Administrator, for gasoline or diesel (whichever is being replaced by the renewable fuel) sold or distributed as transportation fuel in 2005.”
- **Lifecycle greenhouse gas emissions**
  - “Aggregate quantity of greenhouse gas emissions (*including direct emissions and significant indirect emissions such as significant emissions from land use changes*), as determined by the Administrator, related to the full fuel lifecycle...”



# FEDERAL RENEWABLE FUEL STANDARD

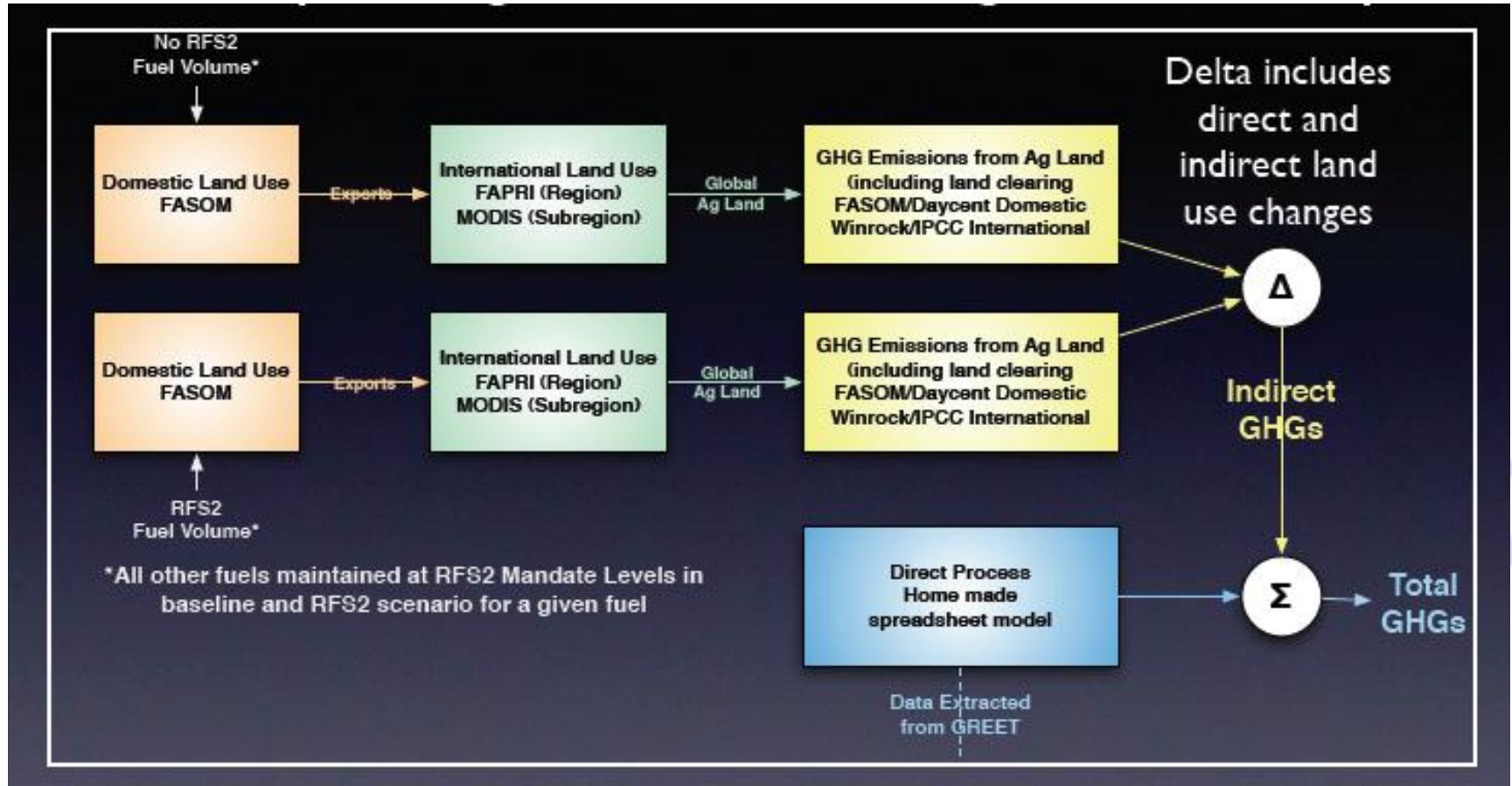
- EISA left determination of ILUC and other indirect emissions to Environmental Protection Agency.
- Very limited body of scientific literature
- In publishing the proposed rule May 26 to implement the RFS, EPA did not attempt to define ILUC, but stated that:

*“significant emissions from indirect land use changes [can] occur in other countries as a result of the increased domestic production or importation of biofuels into the U.S.”*

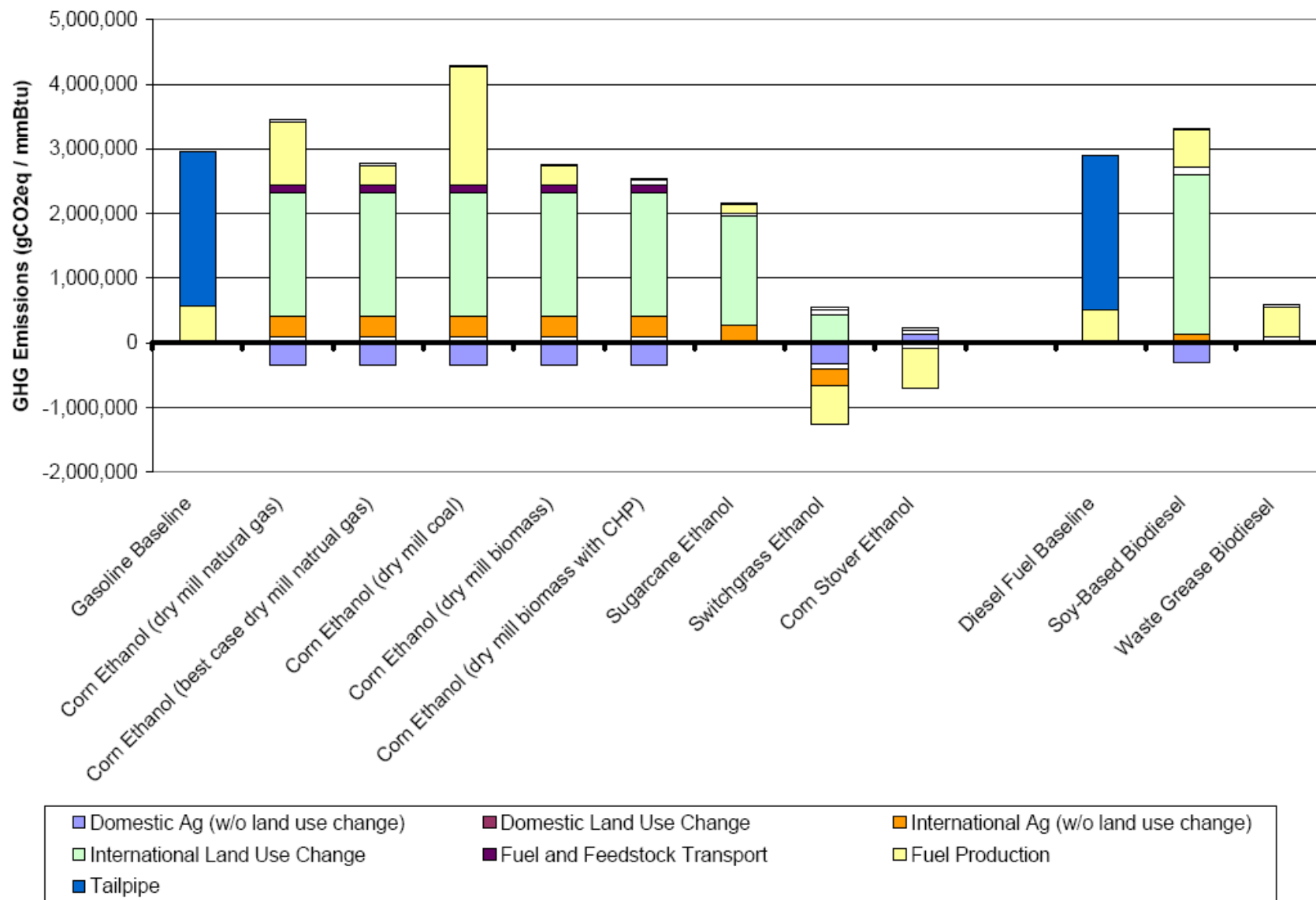


# INDIRECT LAND USE CHANGE

## Crux of Biofuels Policy



**Figure 2. Net Lifecycle Greenhouse Gas Emissions By Lifecycle Component With 30 Year Time Horizon And 0% Discount Rate.**



**Table 1. Draft Lifecycle GHG Emission Reduction Results  
For Different Time Horizon And Discount Rate Approaches.**

<b>Fuel Pathway</b>	<b>100 year, 2% Discount Rate</b>	<b>30 year, 0% Discount Rate</b>
Corn Ethanol (Natural Gas Dry Mill)	-16%	+5%
Corn Ethanol (Best Case Natural Gas Dry Mill) <sup>2</sup>	-39%	-18%
Corn Ethanol (Coal Dry Mill)	+13%	+34%
Corn Ethanol (Biomass Dry Mill)	-39%	-18%
Corn Ethanol (Biomass Dry Mill with Combined Heat and Power)	-47%	-26%
Soy-Based Biodiesel	-22%	+4%
Waste Grease Biodiesel	-80%	-80%
Sugarcane Ethanol	-44%	-26%
Switchgrass Ethanol	-128%	-124%
Corn Stover Ethanol	-115%	-116%

# FEDERAL RENEWABLE FUEL STANDARD

## Notes:

- *EPA currently taking comments on RFS proposed rule*
- *Recently released peer reviews of LCA methodology*
- *House of Representatives passed Energy/Climate bill restricting EPA from including ILUC emissions pending 5-year National Academies of Science review*
- *Final rule expected by end of year*
- *No GHG performance standard is applied to biomass for electricity generation in the Renewable Electricity Standard (RES) being considered by the Senate.*

# CALIFORNIA LOW CARBON FUEL STANDARD

- California implementing its own mandate for low carbon fuels under California Global Warming Solutions Act of 2006 (AB32).
- California Air Resources Board (CARB) adopted LCFS approach, which requires GHG improvements in transportation fuel mix, but does not dictate fuel mix.



# CALIFORNIA LOW CARBON FUEL STANDARD

## Lifecycle greenhouse gas emissions

*“the aggregate quantity of greenhouse gas emissions (including direct emissions and significant indirect emissions such as significant emissions from land use changes), as determined by the Executive Officer, related to the full fuel cycle, including all stages of fuel and feedstock production and distribution.”*



## Lifecycle GHG Emissions Values as Calculated by CARB for California LCFS

		Direct Emissions	Land Use or Other Effect	Total
	<b>BASELINE GASOLINE: CaRFG-CARBOB w/10% ethanol (80% Midwest corn EtOH/20% CA corn EtOH)</b>	95.85	0	95.85
Ethanol from Corn	Midwest average; 80% Dry Mill; 20% Wet Mill; Dry DGS	69.4	30	99.4
	California; Dry Mill; Wet DGS; NG	50.7	30	80.7
	California average; 80% Midwest Average; 20% California; Dry Mill; Wet DGS; NG	65.66	30	95.66
	Midwest; Dry Mill; Dry DGS	68.4	30	98.4
	Midwest; Wet Mill	75.1	30	105.1
	Midwest; Dry Mill; Wet DGS	60.1	30	90.1
	California; Dry Mill; Dry DGS, NG	58.9	30	88.9
	Midwest; Dry Mill; Dry DGS; 80% NG; 20% Biomass	63.6	30	93.6
	Midwest; Dry Mill; Wet DGS; 80% NG; 20% Biomass	56.8	30	86.8
	California; Dry Mill; Dry DGS; 80% NG; 20% Biomass	54.2	30	84.2
	California; Dry Mill; Wet DGS; 80% NG; 20% Biomass	47.44	30	77.4
Cane	Brazilian sugarcane using avg. production processes	27.4	46	73.4



# CALIFORNIA LOW CARBON FUEL STANDARD

## Notes:

- *ILUC penalties disfavor 1<sup>st</sup> gen biofuels*
- *Cellulosic, other advanced biofuels not yet evaluated*
- *Electricity is favored fuel choice*
  - *electricity not subject to ILUC penalties*
- *CARB rejected industry requests to delay inclusion of ILUC pending scientific review, but panel will review methodology*
- *16 other states considering adoption*

# CALIFORNIA LOW CARBON FUEL STANDARD

## Note:

- *Massachusetts last week proposed limiting eligibility for its state RFS to only waste-derived biofuels, citing lifecycle GHG results from EPA and CARB.*



# CAP AND TRADE

House of Representatives passed H.R. 2454,  
American Clean Energy & Security Act of 2009  
(ACES / Waxman-Markey)

- Economy-wide GHG cap [Sec. 700(13)]:

## **COVERED ENTITIES—**

- Any electricity source
- Any stationary source that produces/imports petroleum-based or coal-based liquid fuel or natural gas, the combustion of which would emit more than 25,000 tons of carbon dioxide equivalent
- 10 other categories, including ethanol facilities that burn fossil fuel

# CAP AND TRADE

- Refiners responsible for emissions from combustion of petroleum-based transportation fuel
- Emissions from combustion of biofuels NOT capped
  - Fossil fuels burned in biofuels production capped (for large facilities), but GHGs from combustion of biofuel assumed offset by photosynthetic uptake of biomass feedstocks
- Some ambiguity about biofuel blends

# CAP AND TRADE

## Biofuels incentives in Waxman-Markey

- Market advantage: outside cap
- Advanced biofuels projects eligible for funding through state SEED grants
- Peterson Amendment
  - Delays RFS ILUC calculations 5 years
  - Expands eligible feedstocks (adopts 2008 Farm Bill biomass definition)
  - Grandfathers existing US biodiesel facilities
  - Creates USDA agricultural offsets program

# CAP AND TRADE

## Environmental community:

### Peterson Amendment unacceptable

- Senate expected to work from House bill minus Peterson Amendment
- Ag Committee Chairman Harkin expected to push for Peterson plus
- E-NGOs may push to place biofuels under cap

# CAP AND TRADE

## Capping Biofuels: What would it look like?

- Refiners would be responsible for net uncapped lifecycle emissions from biofuels
  - = Land Use Change emissions, including ILUC
- Under EPA RFS methodology:
  - Refiners would need some allowances for most biofuels – though fewer than for petroleum
  - Cellulosic biofuels could generate surplus allowances

# CONCLUSIONS

- GHG policy (Cap+Trade, LCFS) could be major driver for biofuels, or could dramatically limit adoption
- Application of indirect land use change calculations will be primary determinant
- Critical that ILUC be done right





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