

# Rules Compliance Control

## Global Carbon GHG Advancements



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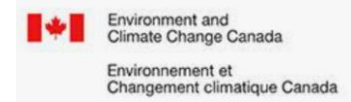
Practices

Audit



# Key Points

- > Overview of low carbon programs
- > Major reduction projects & their challenges
  - > Farm GHG
  - > Fiber & Cellulosic Ethanol
  - > Carbon Capture & Sequestration



	LOW CARBON FUELS STANDRD (LCFS)	CLEAN FUELS PROGRAM	LOW CARBON FUEL STANDARD (BC-LCFS)	Clean Fuel Regulation
LCA MODEL	CA GREET 3.0	OR GREET 3.0	GHGenius	Fuel LCA Model
AVG CISCOPETH/FIB	68.60/28.0	57.03/27.09	43.33	TBD
PATHWAY REPORTING	Annually	Annually	Annually	Annually
VALIDATION OF APPLICATION	2020	Optional	NA	Required
VERIFICATION OF REPORT	Annually 2020	Annually 2021	NA	Annually
AVG 2021 PRICE	111	124.98	146.7	TBD
ETH BLEND MANDATE	10%	10%	5%	5%

Washington  
 Eastern  
 Brazil  
 US National LCFS  
 ISCC  
 Voluntary  
 Midwest  
 Markets  
 Farm CI's

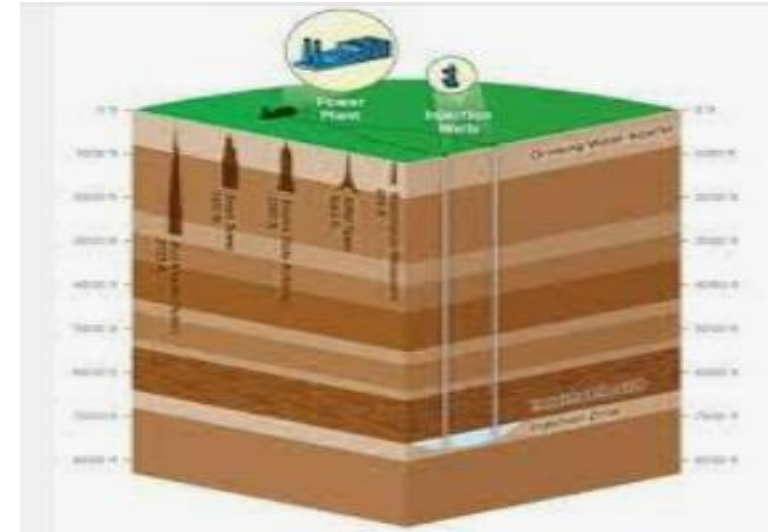
# Ethanol Major Carbon Reduction Projects



Farming GHG  
Reductions



Corn Fiber  
Cellulosic Ethanol



Carbon Capture  
& Sequestration

# Corn Fiber Cellulosic Ethanol

- > Consistency for testing labs
- > Timing of testing – 500k gallons
  - > If testing is not done within time constraints, then cannot claim cellulosic credits
  - > The testing can take many weeks to receive results from the lab
  - > Results must be applied within 5 days of receiving results
  - > Existing test expires 10 business days after reaching 500k gallons of cellulosic ethanol production
- > RFS not currently consistent with low carbon programs
  - > EPA released additional information on lab testing just last week

# Carbon Capture & Sequestration

## Permanence Certification

9-12 month process

Subject to CARB detailed review

- Separate CARB CCS Team

Subject to Independent Reviews

- Professional Engineer
- Professional Geologist

## Pathway/Project Validation

Same process as fuel application

Min 3 mos injection data to apply

Extra professionals needed in VB

- Oil & Gas Specialist
- Professional Geologist

Validations/Verifications

# Carbon Capture & Sequestration

- Only half of the VB's are registered to complete CCS verifications
- Lots of professionals and experts needed to maintain the project as a whole due to independence requirements
- Credit buffer accounts for permanence risks

# Farming GHG Reductions

- > No program has currently adopted this yet
- > Challenges:
  - > Permanence requirements
  - > Tracking and reporting
  - > Number of potential pathways
  - > Cost benefit analysis for farmers





**Thank you!**

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