Update on RFS & LCA Policy Questions

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CRC 2015 LCA WORKSHOP

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Presentation Overview

Session 1: Regulatory Environment/New Policies Driving LCA Pathways and Methodologies

Overview of national, international, and state efforts to implement/revise renewable fuel and other climate-related transportation fuel policies

Update on RFS

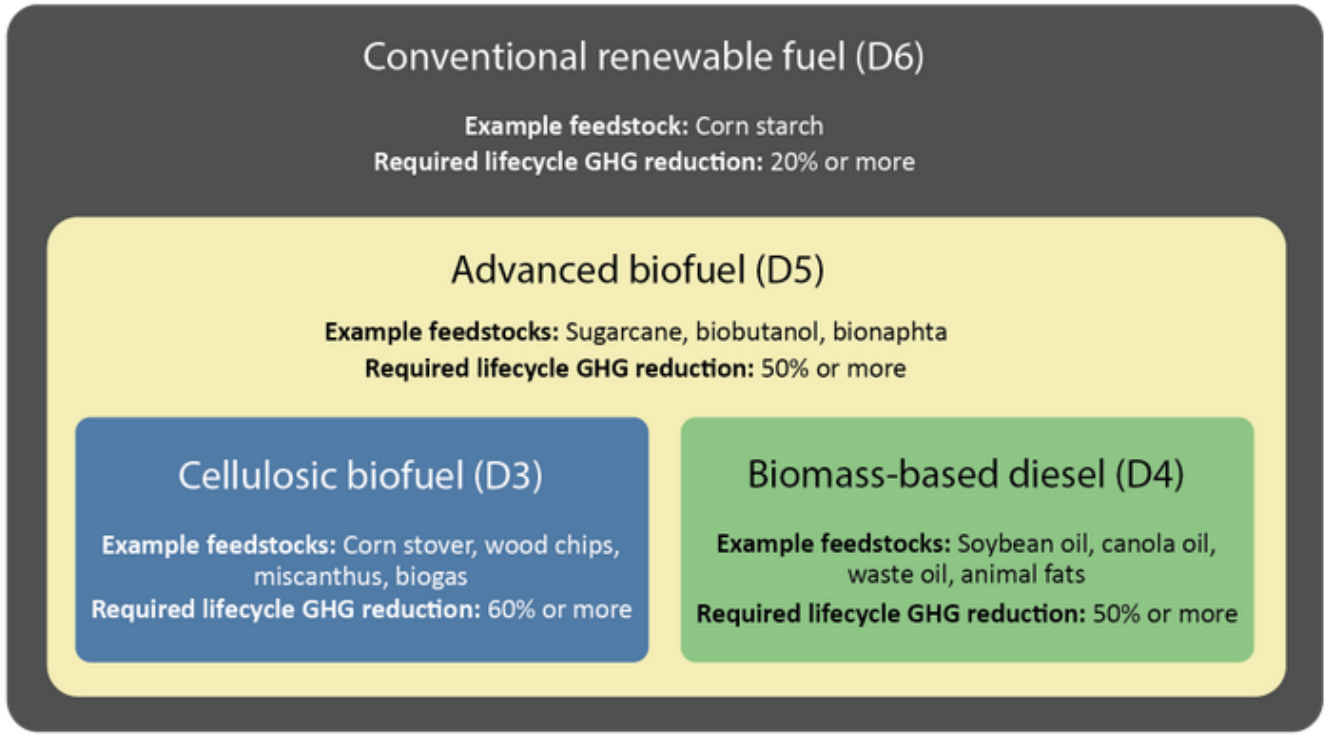
- Background
- Annual volume rule
- Fuel pathways
- Petition process

From a policy perspective, what high-priority research areas would be useful to investigate to address uncertainties and fill data gaps?

LCA-based accounting policy questions

The Renewable Fuel Standard (RFS)

EPA is responsible for developing and implementing regulations to ensure that transportation fuel sold in the United States contains a minimum volume of renewable fuel.



The RFS includes four nested categories of renewable fuel.

RFS Annual Rule

The Clean Air Act (CAA) requires EPA to set the RFS volume requirements annually. The annual standards are based on the statutory targets. The CAA requires EPA to evaluate and in some cases adjust the standards.

In May 2015 EPA proposed to establish the annual percentage standards for cellulosic biofuel, biomass-based diesel, advanced biofuel, and total renewable fuels that apply to all gasoline and diesel produced or imported in years 2014, 2015, and 2016. EPA also proposed the applicable volume of biomass-based diesel that will be required in 2017.

EPA intends to take final action on this proposal by November 30, 2015, which will return the Agency to the program's statutory timeline for issuing RFS annual rules.

Annual Volume Standards (million gallons)

Biofuel Category	Final 2010	Final 2011	Final 2012	Final 2013	Proposed 2014	Proposed 2015	Proposed 2016	Proposed 2017
Cellulosic biofuel	6.5	6.0	0.0	0.8	33	106	206	
Biomass-based diesel	1,150	800	1,000	1,280	1,630	1,700	1,800	1,900
Advanced biofuel	950	1,350	2,000	2,750	2,680	2,900	3,400	
Total renewable fuel	1,295	13,950	15,200	16,550	15,930	16,300	17,400	

Notes: (1) All volumes are ethanol-equivalent, except biomass-based diesel which is actual. (2) EPA has proposed to set the 2011 cellulosic standard at zero. (3) In a January 2013 decision, the D.C. Circuit Court vacated the 2012 cellulosic standard. (4) EPA reduced the 2013 cellulosic standard in the Direct Final rule in April 2014.

RFS Fuel Pathways

A fuel pathway in the RFS includes three components: feedstock, production process and fuel type.

Currently there are 20 broadly applicable pathways in Table 1 to § 80.1426, recent additions include:

- Compressed and liquified natural gas produced from biogas from landfills, municipal wastewater treatment facility digesters, agricultural digesters, and separated MSW digesters
- Electricity used to power electric vehicles produced from biogas from landfills, municipal wastewater treatment facility digesters, agricultural digesters, and separated MSW digesters

Feedstock

A feedstock is a type of renewable biomass that is converted into a renewable fuel.

Production Process

The production process is the type(s) of technology used to convert renewable biomass into renewable fuel.

Fuel

Renewable fuels include liquid and gaseous fuels and electricity derived from renewable biomass energy sources. To qualify for the RFS program, the fuel must be intended for use as transportation fuel, heating oil or jet fuel.

Parties may also petition the EPA to add new pathways to the RFS program.

Improvements to the RFS Petition Process

In 2014, OTAQ conducted a LEAN process which identified a series of improvements designed to improve the transparency and efficiency of our petition review process.

- Received valuable input from stakeholders.
- Revised Fuel Pathways website provides new tools and information resources.
- Created the expedited Efficient Producer petition process.

These improvements are already making a difference.

- Petition review time reduced.
- Faster response to stakeholder inquiries.
- Stakeholders have provided positive feedback.

We continue to make improvements and work toward reducing review time.

Recent Pathway Evaluations

Facility-specific advanced biofuel pathway approvals:

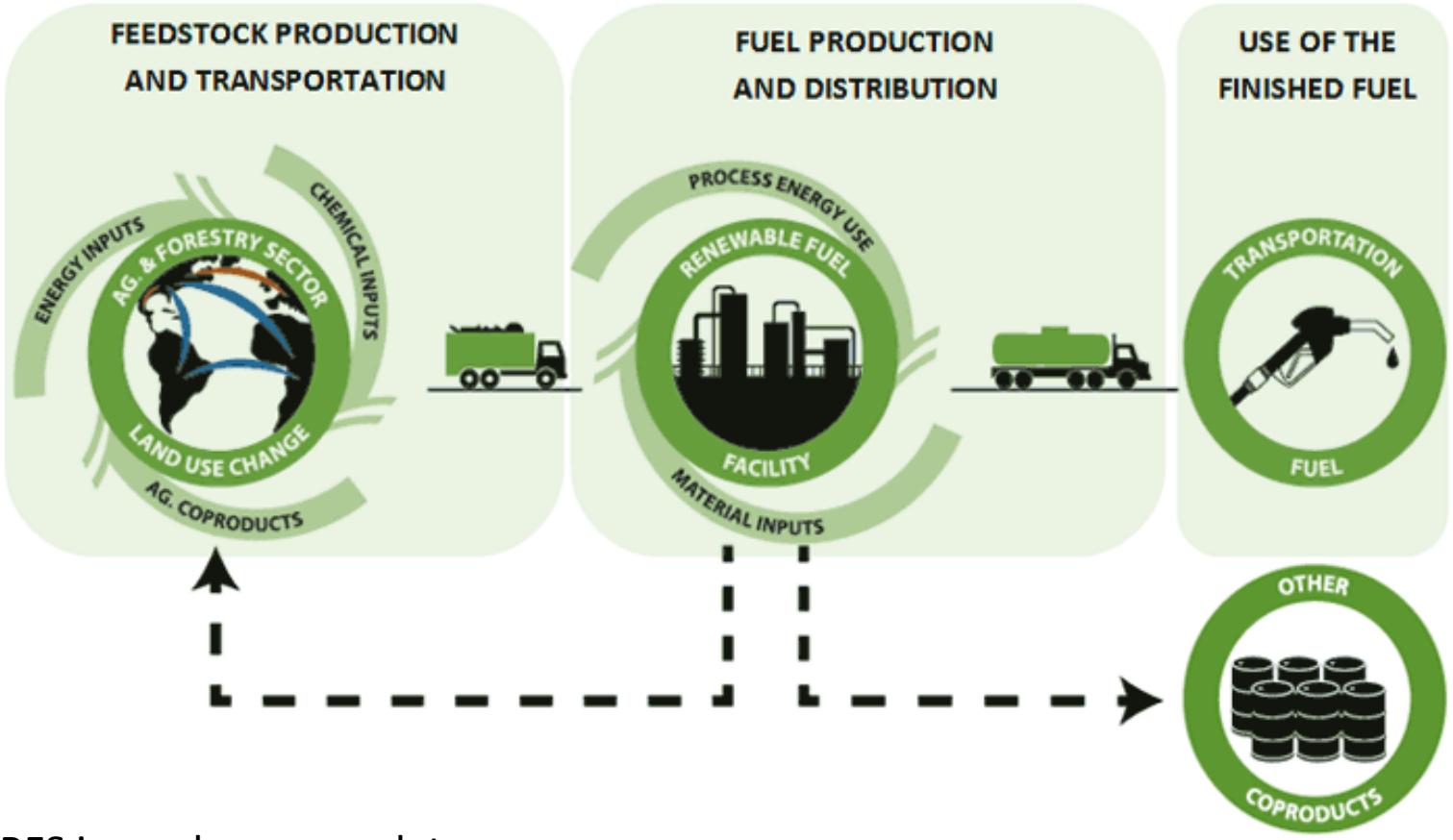
- ENVIA Energy, LLC, diesel and naphtha produced from landfill biogas (May 2015)
- Algenol Biofuels, Inc., ethanol produced from algae (Dec. 2014)

Federal Register Notices on EPA's analyses of the GHG emissions attributable to production and transport of certain feedstocks:

- Jatropha oil (Oct. 2015)
- Cottonseed oil (Jul. 2015)
- Carinata oil (Apr. 2015)
- Pennycress oil (Mar. 2015)
- Biomass sorghum (Dec. 2014)

Biofuel producers seeking to generate RINs for non-grandfathered volumes of biofuel produced from the feedstocks listed above will first need to submit a facility-specific petition.

Lifecycle Analysis for RFS



To estimate "significant indirect emissions" as required by the Clean Air Act, EPA uses a mix of attributional and consequential lifecycle analysis approach that includes:

- Agricultural sector impacts such as increases or decreases in feedstock and livestock production.
- Impacts from using biofuel co-products in the agricultural sector, such as the use of distillers grains as livestock feed.
- Significant emissions from land use changes, such as cultivating new land for feedstocks.

RFS is a volume mandate
Qualifying renewable fuels need to meet lifecycle GHG reduction thresholds

Fuel GHG Intensities

Under transportation fuel climate policy the accounting approach is fuel use times fuel GHG intensity

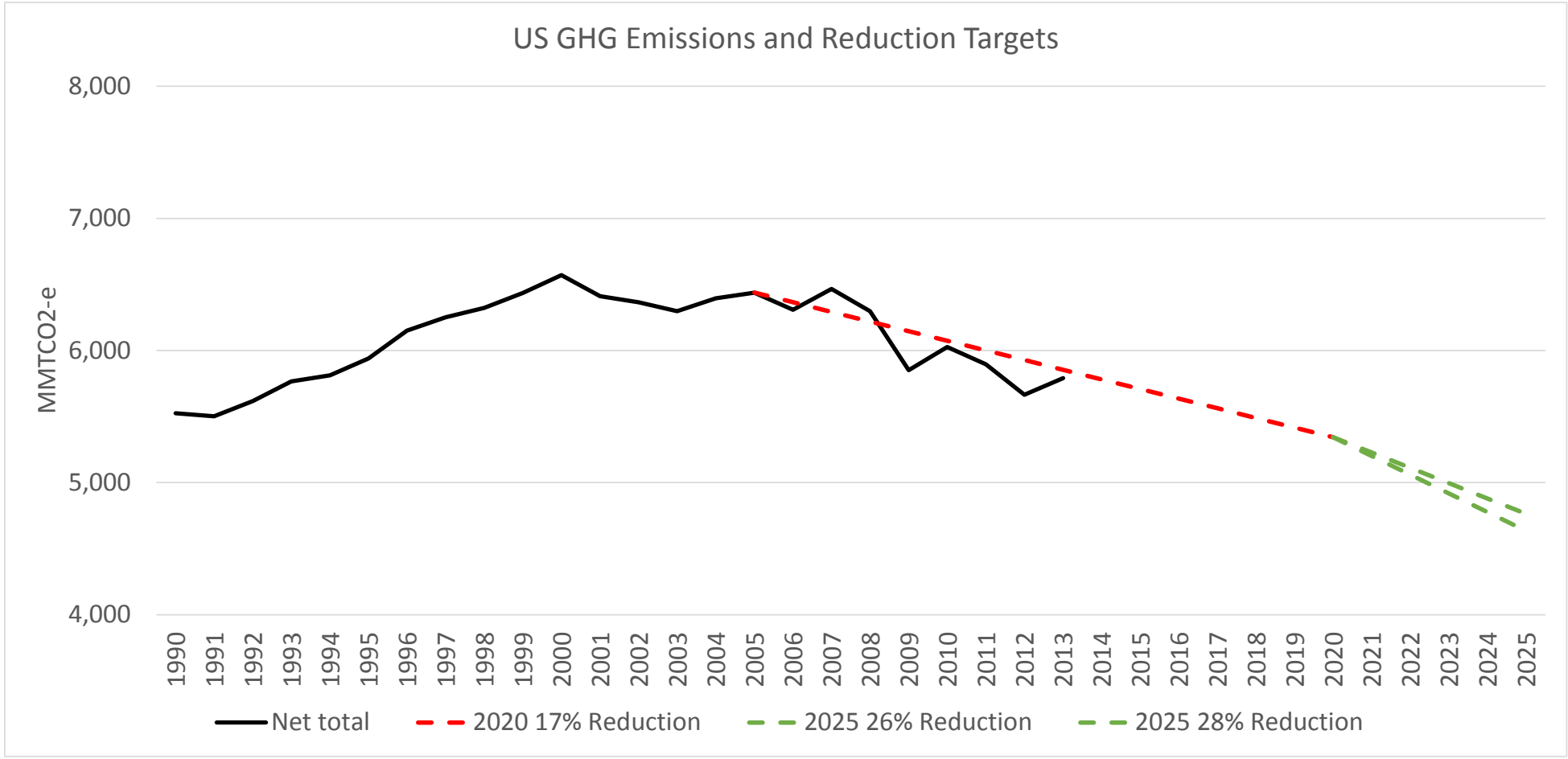
There are different ways to measure the fuel GHG intensities

- Consequential LCA (CLCA)
- Attributional LCA (ALCA)
- IPCC approach (carbon content of fossil fuels, biofuels treated as zero)
- Tailpipe carbon (based on the carbon content of fuel regardless of origin)

	Example Fuel GHG Intensity Values (gCO2-e/MJ)				
	LCA Based			**Non-LCA Based**	
	CLCA/ALCA	*ALCA + iLUC*	*ALCA + iLUC*		
Fuel	**EPA RFS**	**CARB LCFS**	**GREET 2015**	**IPCC**	**Tailpipe C**
Gasoline	93.2	99.8	94.5	71.3	75.0
Diesel	92.0	102.0	90.5	73.9	75.0
Corn Ethanol	73.3	76.0	57.3	0	71.1
Soybean Biodiesel	40.0	57.0	23.2	0	75.9
Grid Electricity (no vehicle eff)	N/A	105.2	170.5	0	0
Grid Electricity (vehicle eff)	N/A	30.9	40.1	0	0
Hydrogen from NG (no vehicle eff)	N/A	113.4	116.0	0	0
Hydrogen from NG (vehicle eff)	N/A	45.4	55.2	0	0

Differences in petroleum factors due in part to variations in crude mix, energy value, and carbon content assumptions

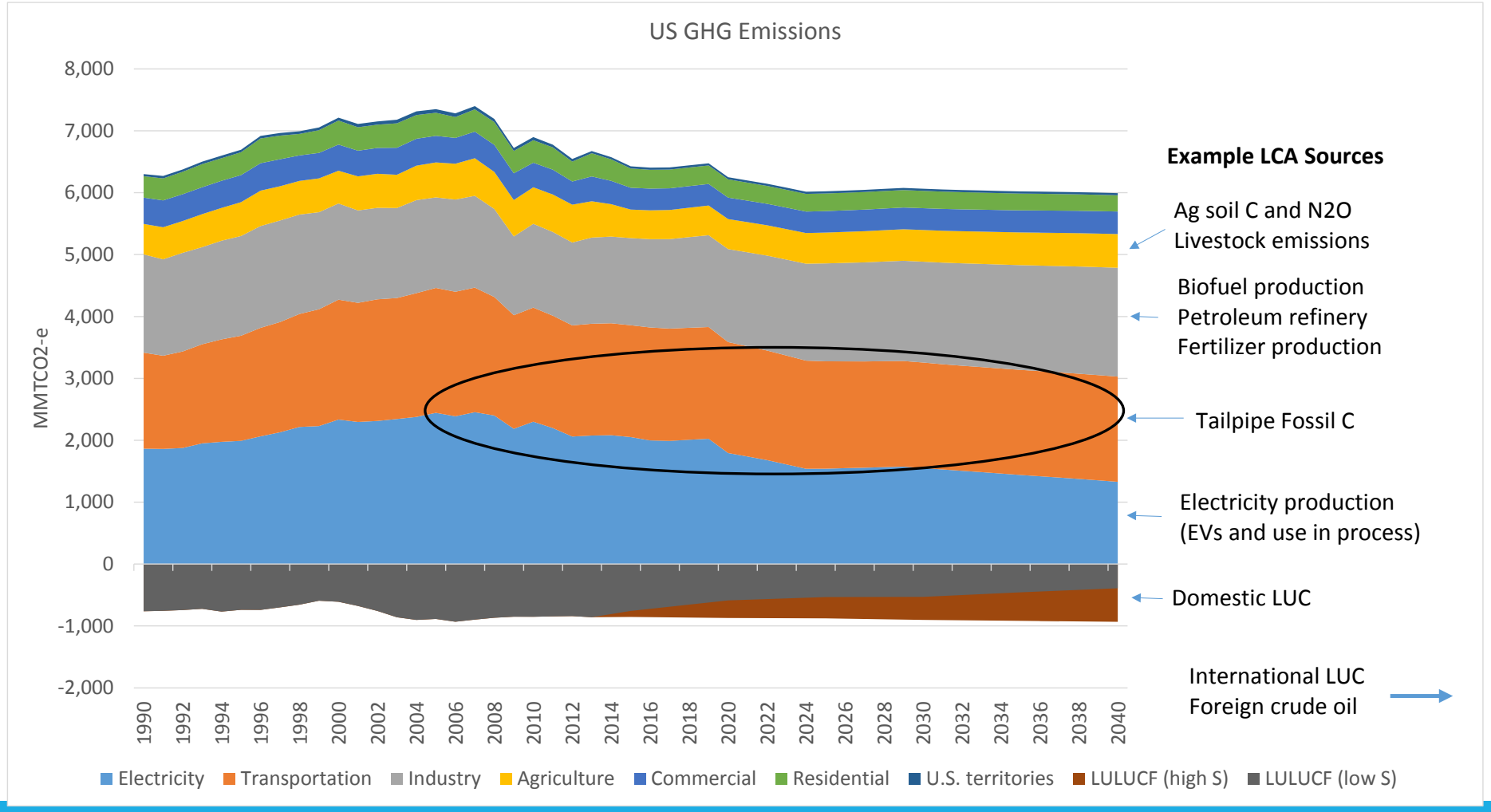
Proposed US Climate Commitments



US Intended Nationally Determined Contribution (INDC) submitted to UNFCCC prior to Paris meetings
Reductions from a 2005 base year

US GHG Emissions Inventory and Projections

Where does LCA fit in the context of broader climate policies?



What do “transportation sector” GHG emissions / reductions based on LCA values really represent?

Progress towards meeting targets will be based on the US National Inventory of GHG Emissions, which uses the IPCC accounting method.

LCA-Based Accounting Research Areas

From a policy perspective, what high-priority research areas would be useful to investigate to address uncertainties and fill data gaps?

- By their nature LCA-based account approaches are broad reaching and capture estimates of emissions in different sectors and across time
- LCA-based accounting approaches used in transportation sector fuels policy are seen as a way to control for leakage and incentivize best practices across different sectors
- However, it is important to consider LCA-based approaches in the context of broader climate targets and other sector policies