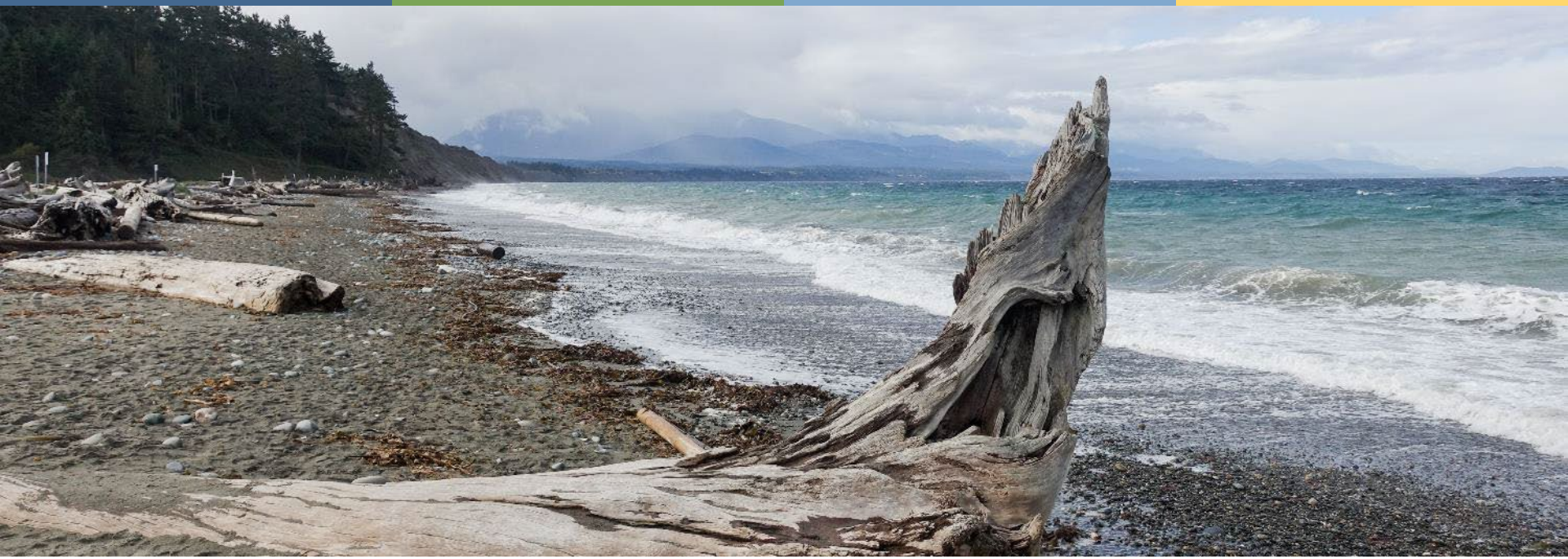


DEPARTMENT OF ECOLOGY
State of Washington

Clean Fuels Program Rule Chapter 173-424 WAC Stakeholder Meeting #5

April 13, 2022

Welcome to the
Clean Fuels Program Rule
Chapter 173-424 WAC
Rulemaking Stakeholder Meeting

We will start at 9 a.m. PDT.

We will check sound 10 and 5 minutes before start.

Sound Check

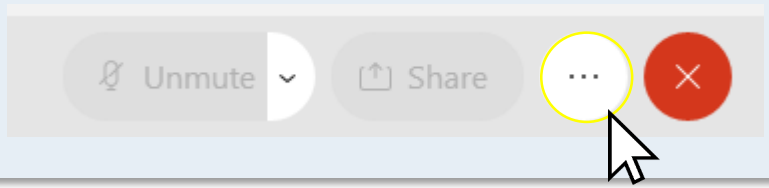
No sound? Connect your audio and listen for a sound check before we start.

All attendees are muted.

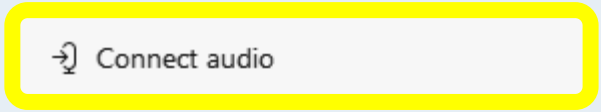
To change your audio connection:

1 ➡ 2 ➡ 3

1. Click on the ‘More Options’ button at the bottom of your screen.

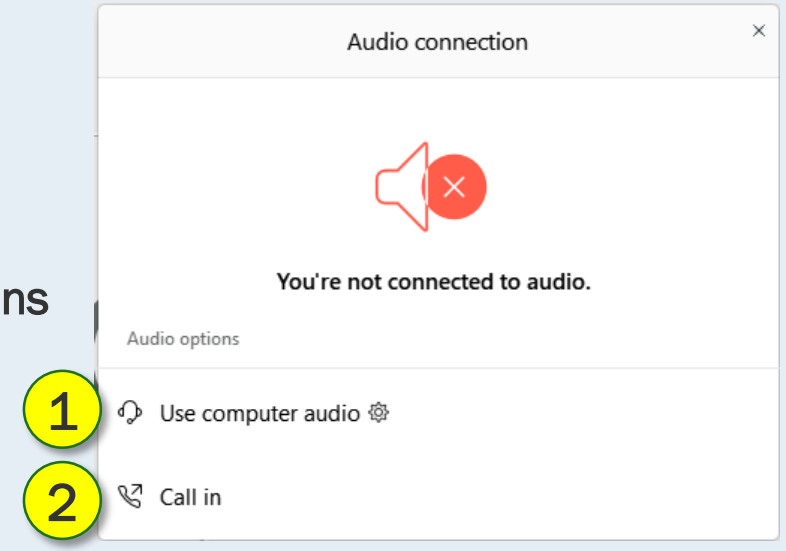


2. Select “Connect Audio” button.



3. Select Audio Connection

2 Options

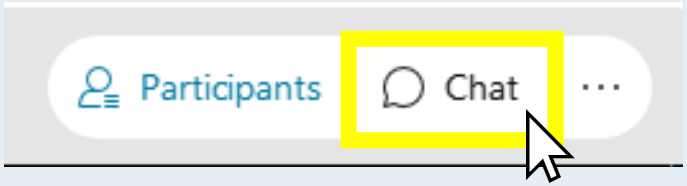


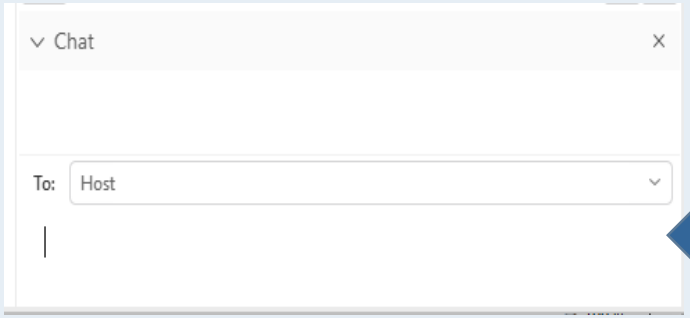
If you select “Call in,” the system will provide you with a phone number and entry information.

How To Use the “Chat” Function

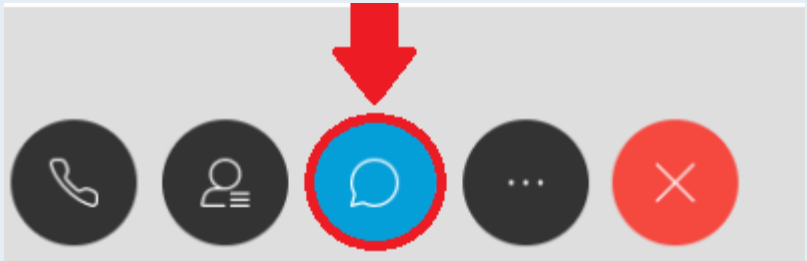
Chat with the host for technical problems

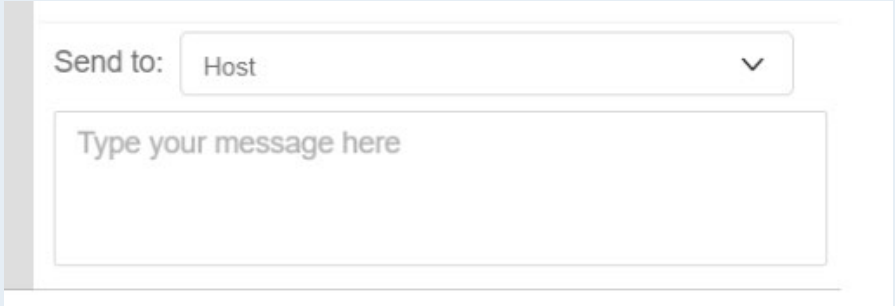
If you are using the WebEx application:





If you are using the WebEx browser:

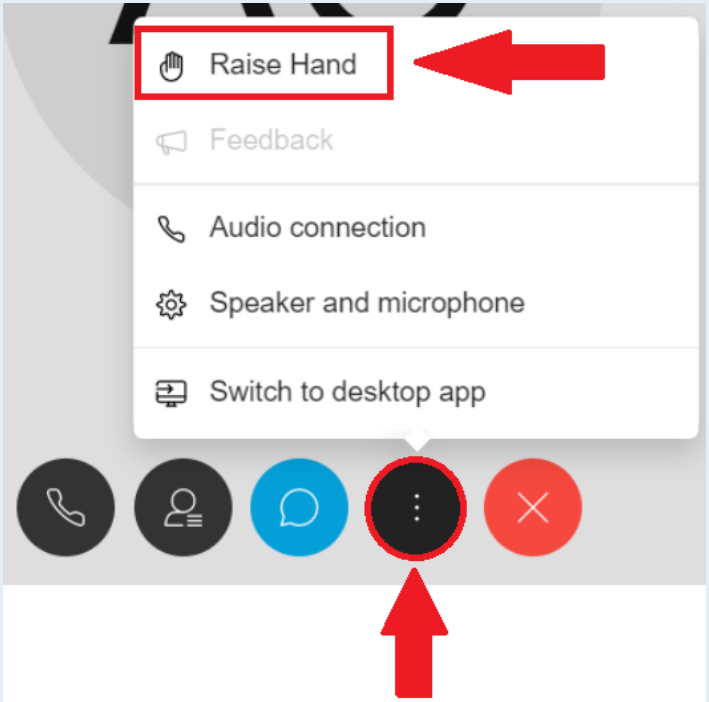




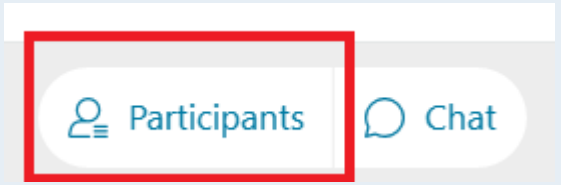
How To Use the “Raise Hand” Function

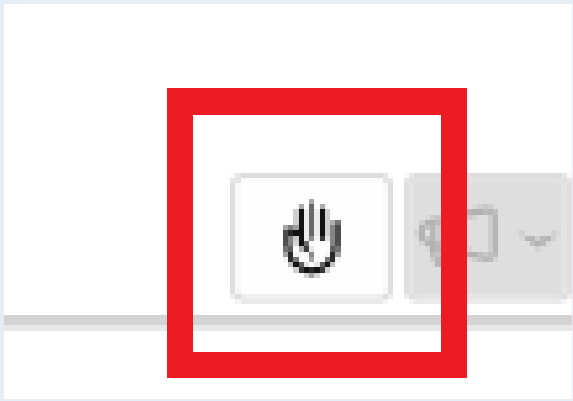
DEPARTMENT OF ECOLOGY
State of Washington

Joined by Browser

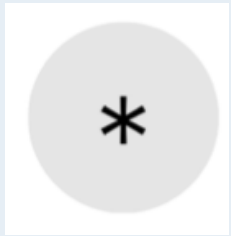


Joined by Application

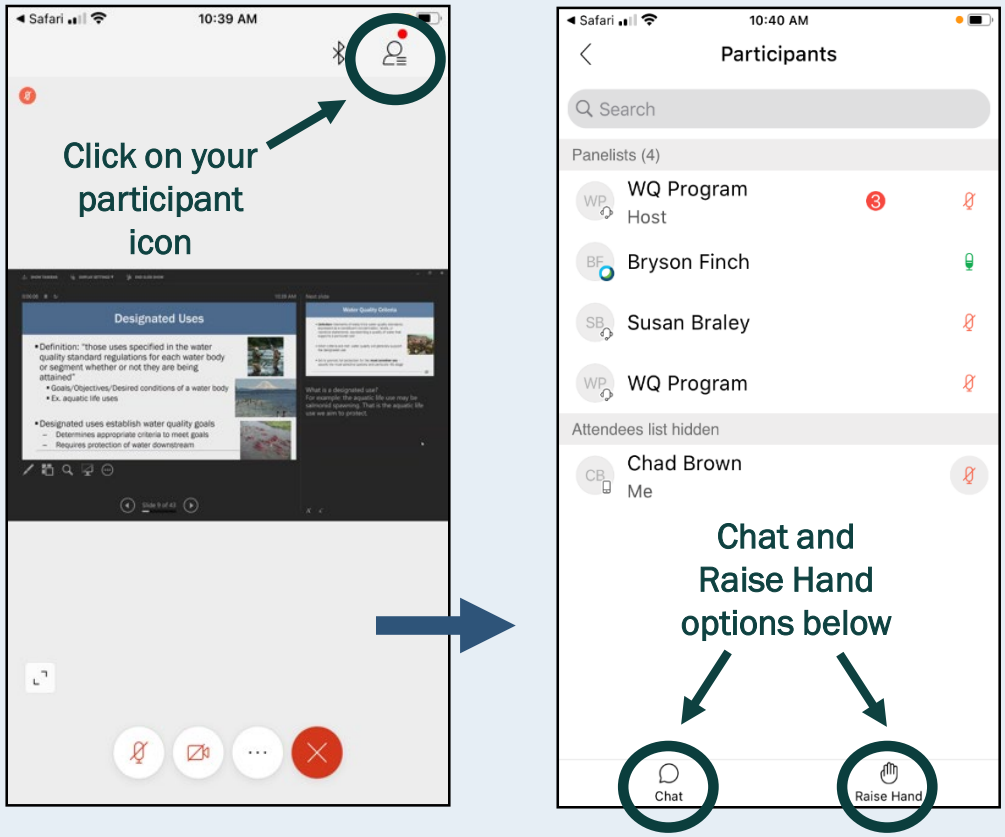




Joined by Phone



For Those Joining via Phone or Tablet



How To Participate

During today's question-and-answer period:

- Participants using computer or mobile app: Use the "Raise Your Hand" button. This button is located in the lower right hand corner of the participant list window.

- Participants listening in on the phone: Press *3 on your phone. The system will show you have your hand raised. The host will unmute you at your turn and the system will announce that you are unmuted.

Start Recording

We will begin recording at this time.

Ecology Staff

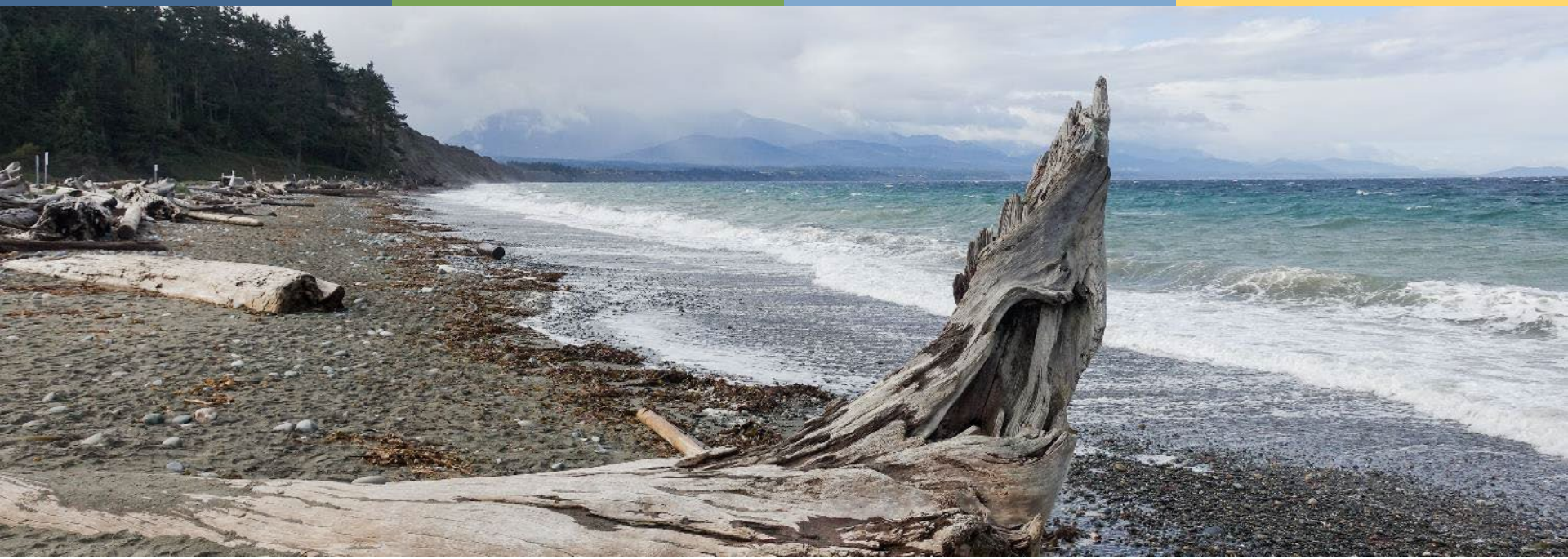
- Laura Westfall – Host
- Tina Maurer – Co-Host
- Jason Alberich – Rules and Planning Unit Supervisor
- Rachel Assink – Rulemaking Lead
- Abbey Brown – Technical Lead
- Joel Creswell – Climate Policy Section Manager
- Debebe Dererie – Fuel Pathway Specialist
- Janée Zakoren – Outreach & Engagement Specialist

Life Cycle Associates and International Council on Clean Transportation Staff

- Love Goyal – Life Cycle Associates
- Nikita Pavlenko – International Council on Clean Transportation
- Jane O'Malley – International Council on Clean Transportation
- Yuanrong Zhou – International Council on Clean Transportation

Agenda

1. Stakeholder comments received and Q&A
2. Peer review of carbon intensity model
3. Update on carbon intensity model
4. Rule timeline, program fees, and draft rule overview



DEPARTMENT OF ECOLOGY
State of Washington

Stakeholder Comments

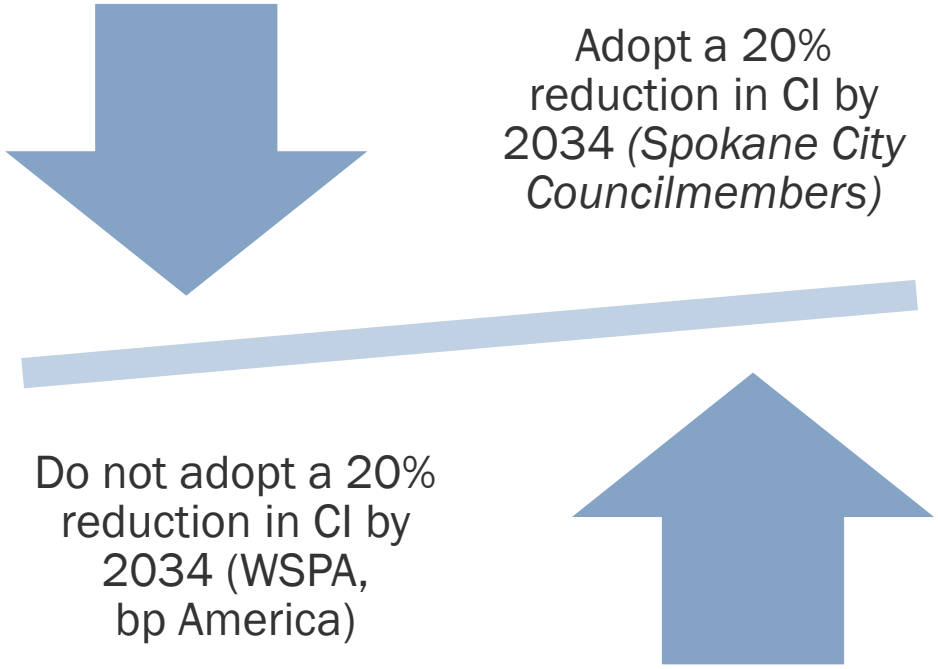
Abbey Brown

Comments Received

Alliance for Automotive Innovation	Avista Corp	bp America	CalPortland
Environmental and social justice organizations coalition	EV automakers coalition	PineSpire	Poet, LLC
Smart Charging Technologies	Spokane City Council Members	Washington Environmental Council/Washington Conservation Voters	Western States Petroleum Association

(Comments submitted between March 8, 2021 – April 8, 2022)

Carbon Intensity Standard



- Require a CI reduction and compliance obligation in 2023 (PineSpire)
- Set a cap on capacity-based credits (PineSpire)

Comments on Residential EV Charging

Support Option 3:
OEMs are allowed to claim a % of credits based on their provision of charging data

(EV automaker coalition, Alliance for Automotive Innovation)

Support Option 1:
Utilities may claim 100% of credit revenue

(Environmental & social justice groups coalition, Avista, Spokane City Councilmembers)

Increase the proposed proportion of credits allotted for EV automakers based on provision of telematics data (EV automaker coalition)

Comments on EV Charging

Non-residential charging: Utility should claim credits. If the utility does not claim credits, charging station owner should receive the credits. (Avista)

Multifamily charging: Clarify who the primary credit generator will be – the owner or the service provider? (PineSpire)

- Allow for inclusion of EERs for more vehicle types, such as electric tractors (PineSpire)
- Include CNG/RNG infrastructure capacity credits (CalPortland)
- Do not require additional/separate metering requirements for EV charging (Spokane City Councilmembers)

Comments on EV Charging

eForklifts

- The credit generator should be the **fleet owner.** (PineSpire)
- The credit generator should be the **charging equipment owner.** (Smart Charging Technologies)

eTRU

- The credit generator should be the **charger** of the vehicle. (PineSpire)

Image source: https://htxforklifts.com/blog/forklifts/can-you-use-an-electric-forklift-in-the-rain/

Comments on Fuel Pathways

Exempt all aircraft fuels (including conventional jet fuel, aviation gasoline, and SAF) and allow these fuels to generate credits (bp America)

Allow for refinery investment credits (WSPA)

Allow for farm-level CI accounting for biofuels (Poet LLC)

Allow for Tier 2 pathway applications starting in 2023 (WSPA)

Comments on Other Topics

- Support for using a market price cap (PineSpire)
- Include book-and-claim accounting for RECs (PineSpire)
- Allow for advance credits for transit agencies, public or non-profit fleets, and Tribal Nations (Spokane City Councilmembers)

We are not noting all the additional clarifications regarding specific sections' wording and definitions.

Question and Answer

Keep questions related to stakeholder comments.

Washington State Clean Fuel Program – Life Cycle Assessment Peer Review

Nikita Pavlenko, Fuel Program Lead,
International Council on Clean Transportation

April 13, 2022
Washington

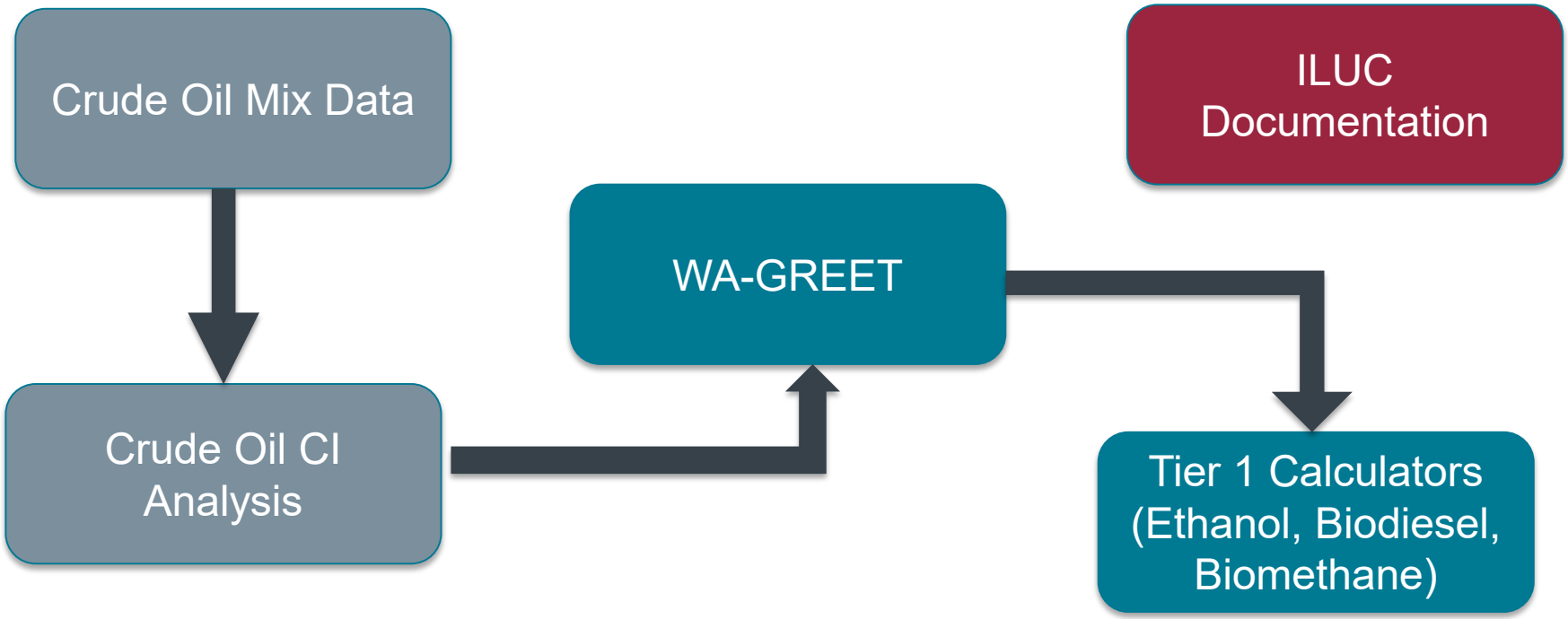
icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Overall Impressions

Overall Impressions

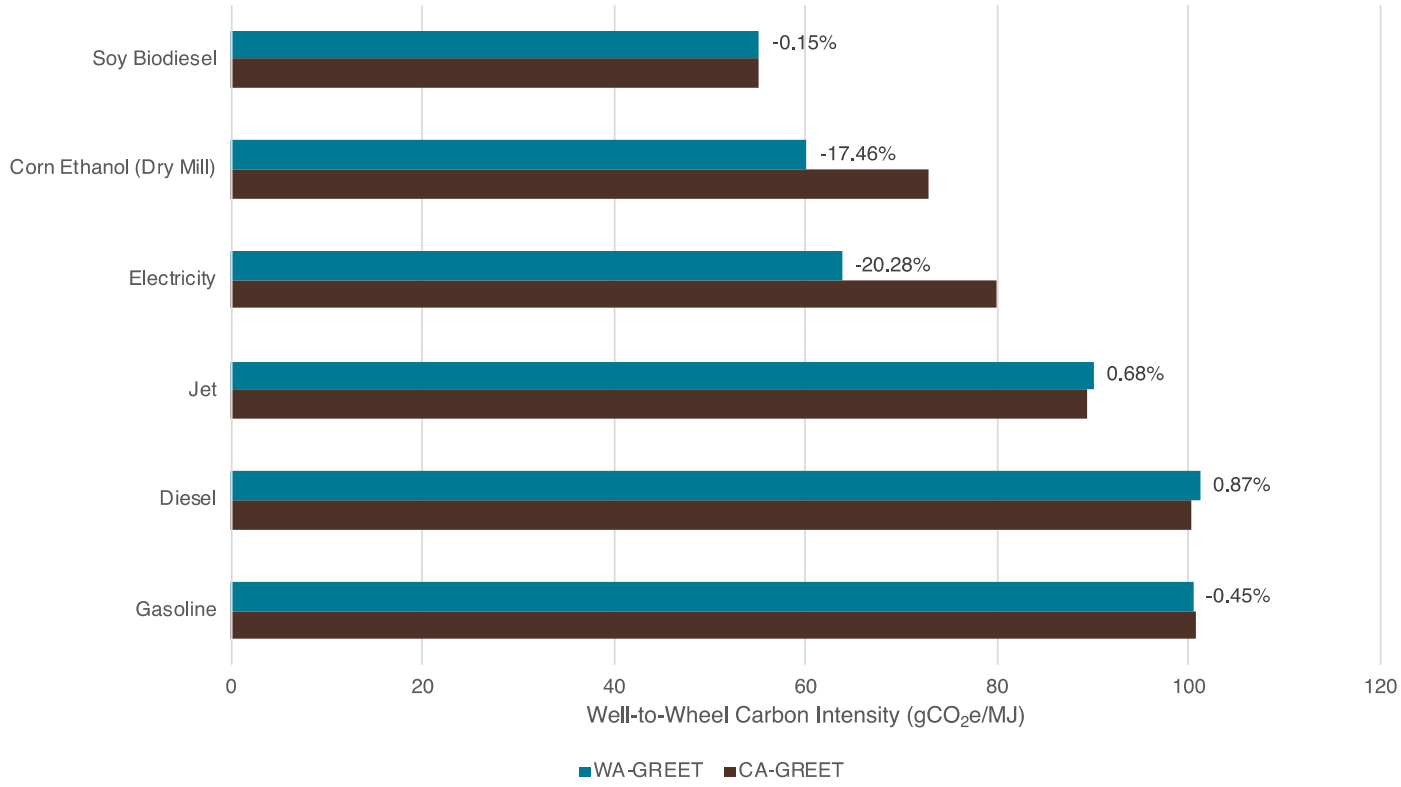
- Life Cycle Associates' approach largely consistent with LCA methodology and rigor of California LCFS
- Minor data gaps, particularly on crude oil mix & electricity. LC Associates' assumptions allow for reasonable approximations
- Results of LCA largely align with expected ranges & existing literature
- Additional analysis and recommendations necessary to address ILUC

Peer Review Approach



icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Overview of Key Pathways



icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Crude Oil Assessment

icct
THE INTERNATIONAL COUNCIL
ON CLEAN TRANSPORTATION

Summary of Approach

- Primarily based on state-level disclosures of oil imports (WA, UT, MT)
  - Supplemented with EIA, ECY input, and Canadian data
- Use existing life-cycle CI's from California OPGEE assessment
  - Adjusted for transport distance

OPGEE 2.0 Model: https://eao.stanford.edu/opgee-oil-production-greenhouse-gas-emissions-estimator

Data Gaps

- Field level data absent from WA sources
- No OPGEE CI for three oil sources (~0.5% of WA crude oil mix, 2% of MT crude oil mix)
- Source of Canadian crudes for MT and UT refineries
- Transport distance adjustment for MT & UT crude oils

Refinery Modeling

- Based on Argonne National Labs' linear modeling study
- Based on energy efficiency of refinery, allocation of emissions to co-products
- WA state refinery configuration similar to CA & US-average

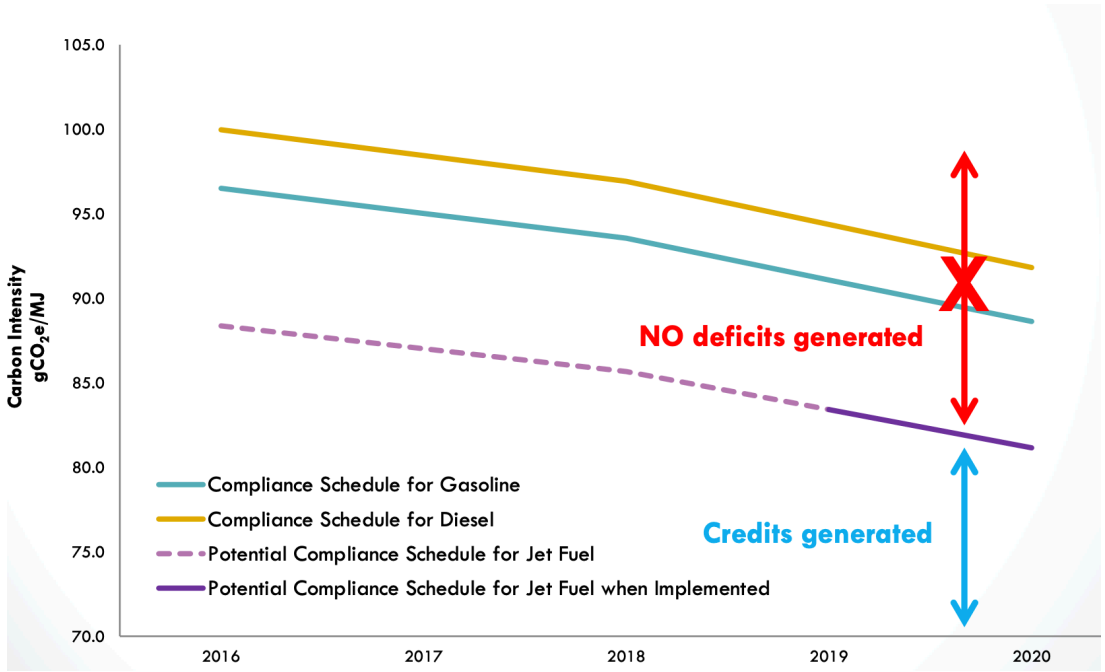
Refinery type breakdown (vol%)	Washington	California	U.S. average
Vacuum distillation	24%	22%	21%
Thermal cracking	7%	9%	7%
Catalytic cracking – Fresh	12%	13%	14%
Catalytic cracking – Recycled	0.2%	0.3%	0.2%
Catalytic hydro-cracking	5%	9%	6%
Catalytic reforming	12%	7%	9%
Hydrotreating/ Desulfurization	38%	39%	42%
Fuels solvent deasphalting	2%	1%	1%

EIA Downstream charge capacity: https://www.eia.gov/dnav/pet/pet_pnp_cap1_dcu_nus_a.htm

icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Jet Fuel Carbon Intensity

- WA-only crude mix (no imports from UT+MT)
- ~10% lower WtW emissions than diesel or gasoline
- Refinery emissions not documented, but consistent with diesel & gasoline approach
- Recommend implementation as an ”opt-in” benchmark



LCFS: Evaluation of alternative jet fuel inclusion; https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/lcfs_meetings/031717presentation.pdf

icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Recommendations

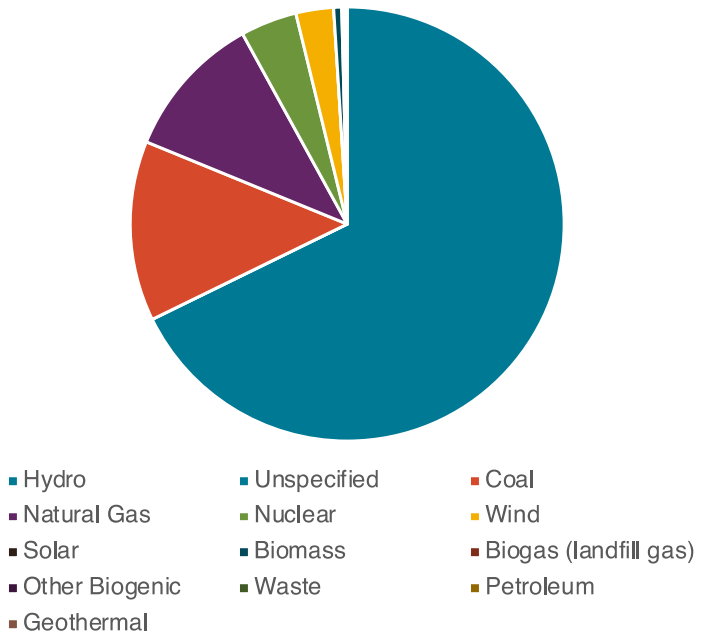
1. Incorporate jet fuel CI as a benchmark for AAF's; document refinery modeling & crude mix for this pathway, ensure consistency with diesel & gasoline
2. Long-term: Improve data resolution of crude oil imports to WA state
3. Long-term: Use OPGEE 3.0 to assess WA crude oil CI, particularly as crude oil mix changes
4. Long-term: Evaluate in-state refinery emissions with dedicated LCA tool

Electricity

icct
THE INTERNATIONAL COUNCIL
ON CLEAN TRANSPORTATION

Summary of Approach

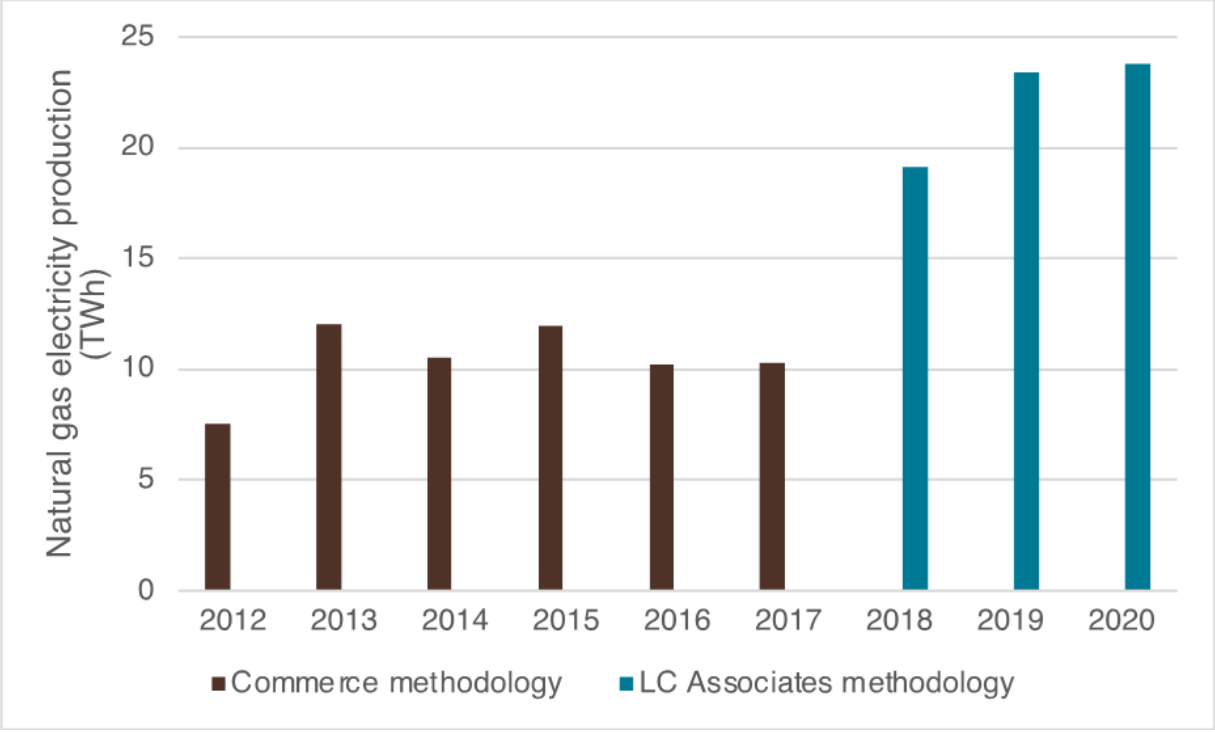
- Based on WA Commerce disclosure report of fuel mix
- “Unspecified” electricity is ~13% – attributed to natural gas, with biogas & cogeneration
- Emissions from “waste” & “other” attributed to residual oil (<1%)



icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Re-Allocation of Unspecified Electricity

- Likely over-attribution to natural gas
- Re-weight based on previous Commerce methodology
- Minor decrease in emissions (~6 gCO_2e/kWH)



icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Recommendations

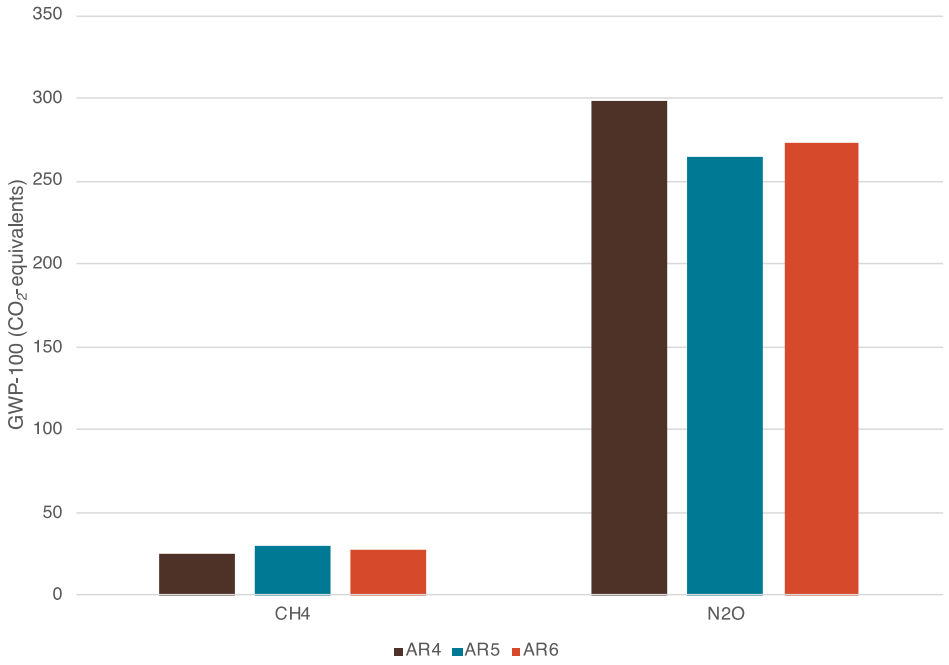
1. Re-allocate “Unspecified” emissions to a representative breakdown of electricity sources
2. Update model to attribute waste-derived electricity emissions to landfill biogas and waste-to-energy incineration (less than 1% of state-wide electricity)

Choice of Global Warming Potential

icct
THE INTERNATIONAL COUNCIL
ON CLEAN TRANSPORTATION

Comparison of GWP Values

- WA-GREET utilizes AR4 GWP's from 2007
- We recommend updating the model to AR5 GWP factors; align with forthcoming OPGEE 3.0 and 2024 GHG Inventory reporting
- Likely minor effects, except for pathways with high methane leakage



icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Indirect Land-Use Change Emissions

icct
THE INTERNATIONAL COUNCIL
ON CLEAN TRANSPORTATION

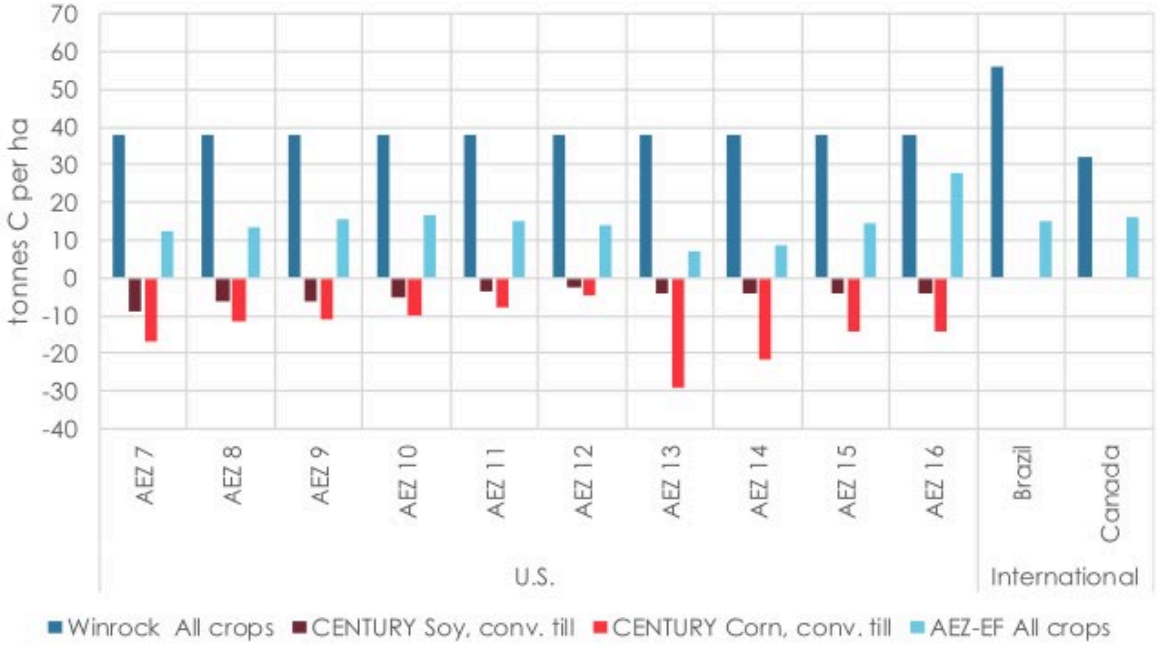
Summary of Changes

- LC Associates recommends CARB LCFS ILUC values; Oregon CFP ILUC for corn & sorghum
- Zero ILUC for cover crops
- Substantial variation in the literature remains; key differences on soil carbon, land database, and yield

		Ethanol				Biodiesel/ Renewable Diesel			
Study	Model	Corn	Sorghum	Sugar cane	Corn Stover	Soy	Canola	Palm	Carinata
iLUC (g CO_2e/MJ Fuel)									
EPA 2010	FASOM/FAPRI	26.3	28.0	5.1		31.9			
CARB 2009	GTAP BIO	30	45	46		42		N/A	
CARB 2014	GTAP BIO ADV	19.8	19.4	11.8		29.1	14.5	71.4	
OR LCFS	GTAP BIO ADV	7.6	19.4	11.8	0	29.1	14.5		
ANL 2018	CCLUB GTAP 2011	7.4				7.9			
ANL 2018	CCLUB GTAP 2013	3.9							
		ATJ	ATJ	ATJ	ATJ	SPK	SPK	SPK	SPK
CORSIA	GTAP BIO ADV	21.7		7.4		20.0	20.7	34.6	-21.4
CORSIA	GLOBIOM	22.5		7.2		50.4	27.5	60.2	N/A
Recommended WA CFS		**7.6**	**7.6**	**11.8**	**0**	**29.1**	**14.5**	**71.4**	**0**

Choice of Land Conversion Emission Factor Model

- CCLUB estimates soil carbon increase for cropland-pasture to cropland
- Other models & field data suggest opposite effect
- Cropland-pasture effects drive a portion of ILUC trends

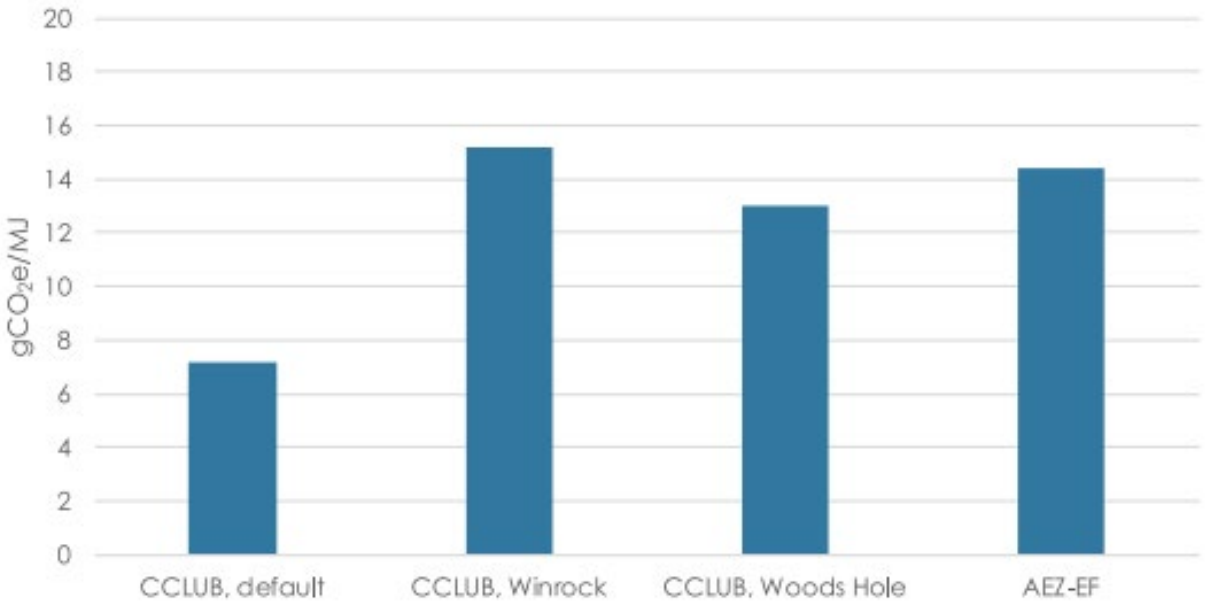


Malins et al., (2020). How robust are reductions in modeled estimates from GTAP-BIO of the indirect land use change induced by conventional biofuels? https://doi.org/10.1016/j.jclepro.2020.120716

icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Choice of Land Conversion Emission Factor Model

- CCLUB estimates soil carbon increase for cropland-pasture to cropland
- Other models & field data suggest opposite effect
- Cropland-pasture effects drive a portion of ILUC trends

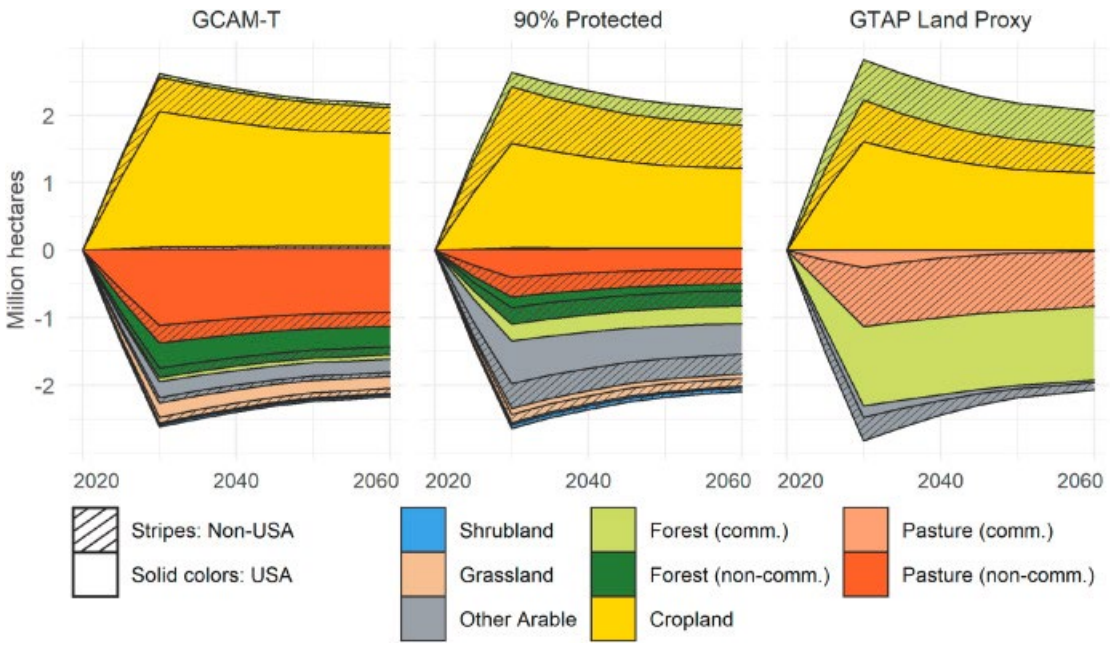


Plevin, 2015. Comments on modeling biofuel-induced land-use change emissions. https://drive.google.com/file/d/1cMDft6iVnWukFlz0n_T760yoSznKCj6C/view

icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Unmanaged Forestland

- GTAP does not assess impacts on forestland without economic value (i.e., unmanaged forestland)
- ILUC emissions sensitive to share of protected forestland
- Counterintuitive results—domestic deforestation results in foreign afforestation

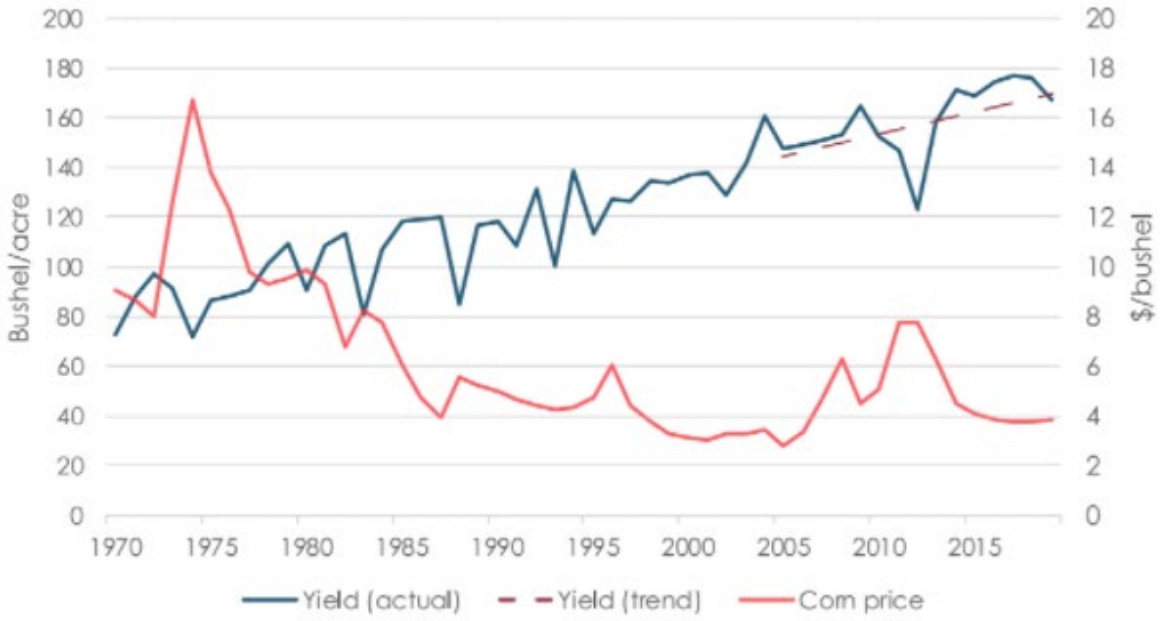


Plevin et al. (2022). Choices in land representation materially affect modeled biofuel carbon intensity estimates. https://www.sciencedirect.com/science/article/pii/S0959652622010988?via%3Dihub

icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Yield Increase & Double-Cropping

- Multiple upward revisions of yield elasticity (YDEL) in GTAP revisions
- Actual yield increase linked to multiple non-economic factors
- Recent GTAP model changes greatly increase cropping intensity (i.e., double-cropping) absent evidence



icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Cover Crops

- Zero-ILUC recommendation for cover crops is too sweeping
- Previous CARB & EPA analyses more limited in scope
- Multiple definitions – intermediate crops, secondary crops, cover crops, with different definitions and integration with existing food market
- Define “cover crop” and implement system for verifying no displacement of cropland

ILUC Recommendations

1. In near-term, use full set of CARB ILUC factors for crop-derived fuels
2. ICCT does not include a zero ILUC emission factor for cover crops. First, define “cover crop” within policy and pair with verification scheme to ensure no displacement of cropland
3. In long-term, valuate ILUC impacts of WA CFP with feedback from stakeholders, academic experts, regulators from CARB & EPA; consider alternative economic & land conversion models such as GCAM

Summary of Recommendations (Near-Term)

1. Include fossil jet fuel CI as a benchmark for alternative aviation fuels on an opt-in basis
2. Re-allocate unspecified electricity to representative breakdown of electricity sources; add emission factors for landfill gas & waste-to-energy electricity
3. Update WA-GREET to include AR5 GWP's

Summary of Recommendations (Long-Term)

1. Improve granularity of crude oil import data
2. Assess CI of imported crude oil and refinery practices specific to WA
3. Develop annual updates to electricity mix and improve resolution of electricity sources
4. Evaluate ILUC impacts of WA CFP with feedback from stakeholders, academic experts, regulators from CARB & EPA; consider alternative economic & land conversion models

icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Update on Carbon Intensity Model

Love Goyal

Stefan Unnasch

Life Cycle Associates

Washington CFS Public Meeting Presentation

Life Cycle Modelling Tools

Love Goyal
Stefan Unnasch

April 13, 2022

Outline

- Stakeholder Comments on LCA modelling
  - Petroleum fuel Modelling
  - Bioethanol pathways
  - iLUC
  - General comments
- Responses to Comments
- Draft Washington Utility CI Calculation Tool

Comments Received

POET LLC	Western States Petroleum Association	Washington Environmental Council
Clean Fuel Alliance for America	Neste	ChargePoint
International Council on Clean Transportation	Phillips 66	Other Oral Comments

Comments on Petroleum Modelling

OPGEE model	• Use OPGEE 3 instead of OPGEE 2.0c (multiple)
Canadian Crude	• Calculate averaging based on production level and delivery volume by specific field (WSPA) • Canadian Crude transport to Washington vs California (WSPA)
Crude Refining in GREET	• Update process fuel use in refineries (WSPA) • Request to clarify refining efficiency in GREET (Phillips 66)

Comments on Bioethanol

- Allow Site-specific agricultural inputs (POET)
- User-defined chemical use (POET)
- Distinguish electricity use for DDGS drying (POET)
- Provide credit for capture fermentation CO_2 (POET)

Comments on iLUC

Corn Ethanol iLUC Value	• "Most LUC estimates are now converging on substantially lower estimates" (POET) • Insufficient evidence for reduced value (Washington Environmental Council)
General Comments	• Searchinger et.al. (2008) reference out of date (WSPA) • Soy Oil iLUC too high, re-evaluate (WSPA) • Require annual auditing to verify mischaracterization of palm oil (WSPA)
New fuel feedstock	• How will it be determined? (Oral comment)

General Comments

- Use newer GREET model (POET and Neste)
- Use of Global Warming Potential (GWP) 100-year vs 20-year timeframe (WEC)
- Ensure accurate, updated natural gas leakage rates (WEC)

General Responses to Comments

Life Cycle Associates LLC

Trinity Consultants

Public Comments

- Comments have been addressed in the updated supplemental documentation as appropriate
- Crude and Petroleum
  - Expanded the supplementary documentation to address comments and further clarify methodology
  - Minor changes required, to be implemented in next version
  - Summary responses to each comment included here
- Bioethanol
  - Ongoing consultation with Department of Ecology
  - Modelling solutions can be developed following decisions on requested provisions
    - Not implemented in current version

Public Comments

- iLUC
  - Comments addressed in the updated iLUC assessment memo
  - Results have not been affected till date
- General comments
  - Adoption of CA-GREET3.0 is deemed appropriate by Ecology as baseline modelling tool
    - Dictates the overall framework for CI calculation
    - Selectively choosing input parameters from newer GREET model directly challenges consistency across all biofuel pathways
    - Natural gas leakage rates in CA-GREET3 were comparable with GREET1_2021, no changes made to WA-GREET
  - Require additional consultation with Ecology

Peer Review Comments

- Detailed peer review report received on April 4, 2022
- Comments currently under review, to be addressed in next versions of models as well as documentation as appropriate
  - Responses to comments specifically related to crude CI included here

Detailed Responses on Crude and Petroleum CI Comments

Life Cycle Associates LLC

Trinity Consultants

Public Comments

- **Use of OPGEE 3.0 instead of OPGEE2.0:**
  - WA Ecology and LCA/Trinity do not have access to OPGEE3.0 which is currently under development by Stanford University. We have reviewed draft technical documentation for OPGEE3.0 and the magnitude of emissions changes for specific oil fields are unclear.
  - We recommend the use of the latest model version for future crude CI updates.

- **Include all crude oil types processed in WA, MT, UT:**
  - The only crude fields omitted from the WA crude CI analysis were Brunei and Papua New Guinea, which represented only 0.5% of crude imports in 2017. Their CI was not available in OPGEE2.0.
  - There were no OPGEE2.0 inputs or outputs for Montana crude.
    - Minor impact on average crude CI calculations for MT refineries (2% of total crude).
    - OPGEE CI modeling for MT oil fields is recommended for future updates.
  - Similar to CA LCFS, we recommend the use of a default CI value (=average crude CI) for crude oil fields not available in the Washington CFS CI Lookup Table for Crude Oil.

Public Comments

- **Differences in transport mode between CA and WA for the crude transport adjustment calculation:**
  - The crude transport adjustment accounted for both distance and mode.
  - For example, for Canada crude transport vessel distance to CA was replaced with vessel, pipeline and rail distances to WA.
  - Note higher emissions factors for rail and pipeline offset shorter travel distances for vessels.
  - Technical document (Appendix A) was updated to include OPGEE emission factors and additional clarification.

- **Use of production volumes for Canadian oil fields to come up with an average crude CI value for Canada:**
  - Even if production data is used, significant uncertainty will remain related to actual import volumes to WA by oil field. Therefore, we chose a more straightforward, conservative and easier to replicate approach, consistent with Oregon DEQ.
  - We recommend that future average crude oil CI updates include actual crude import data by oil field/MCON to improve its accuracy.

Peer Review Comments

- **Consider the use of oil property data for multi-field countries importing into WA:**
  - Impacts how individual oil field CI values are averaged by country of origin (8% of crude imports)
  - We have considered this approach but find our methodology more straightforward and easier to replicate.
  - ICCT sensitivity testing for Brazil resulted in only a minor CI difference (5.76 vs 5.86)
  - Researchers acknowledged that uncertainties remain with their proposed approach to allocate total import volumes by oil field using API and sulfur data and match with corresponding CI values in OPGEE.
  - This issue can be resolved with annual reporting of crude oil imports by field/MCON.

- **WA crude transport adjustment was not well documented:**
  - We have updated Technical Support Document (Appendix A) with OPGEE transport emission factors by mode that were used to develop a CI adjustment for WA crude oil average due to crude transport differences.

Peer Review Comments

- **Canada crude inputs to Montana and Utah refineries could be refined further:**
  - Crude CI for Montana refineries is driven by Canada imports from Alberta based on state economic reports.
  - The oil sands vs conventional split is applied based on Alberta oil field production data for 2017.
  - The assumption that 84% of Canada crude imported to MT were oil sands is supported by Canada Energy Board data for PADD 4 imports in 2017.
  - Given Montana finished fuel imports are only 6% of total fuel used in WA state, any changes to the methodology was have a minor impact on the overall petroleum CI values.
  - Ecology may choose to conduct OPGEE modeling for MT crude for future WA crude oil average CI updates.

- **Sources for Montana and Utah crude CI Values were unclear:**
  - Technical support document (Appendix A) was updated with sources for Wyoming and Utah crude CI, which were used for MT and UT average crude CI calculations.

WA Utility CI Calculator

Life Cycle Associates LLC

WA Utility CI Calculator

- Draft version 0.2a – based on 2020 WA Utility mix disclosure report
- Follows WA-GREET electricity CI calculation but implemented externally to WA-GREET

Life Cycle Associates, LLC

Washington Utility CI Calculator for the Washington Clean Fuel Standard

Current Version: 0.2a
Model Year 2020
Date Modified 4-Apr-22

Authors

Love Goyal goyal@lifecycleassociates.com
Stefan Unnasch Unnasch@lifecycleassociates.com

Description

This Excel workbook contains a life cycle GHG model for Power Production from Utilitites within Washington. This tool is developed for the Washington Clean Fuel Standard

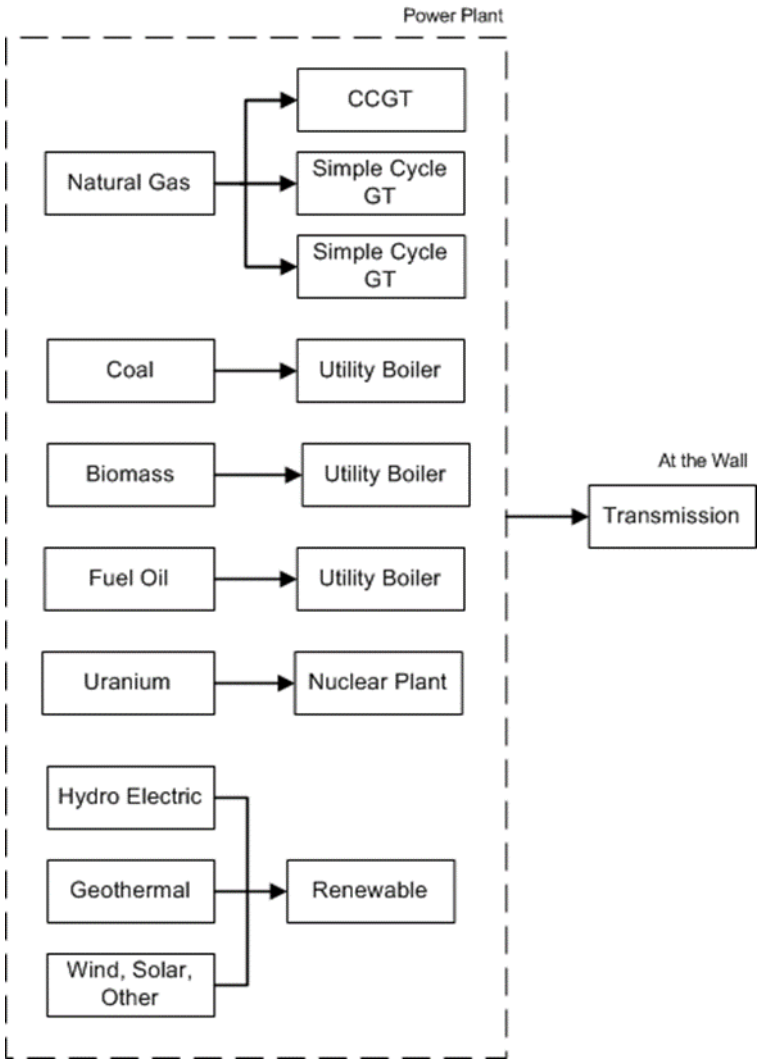
Legend

Worksheets	Text Color
Information	Drop-down Menu
Input, Data	Input parameters are in blue text and may be changed by the user
Detailed System Data	Calculations are black text and should not be changed
Calculations	
Results	
LCI Data, Database	

Sheet	Contents
Utility_CI	Utility Selection and lifecycle CI Results
Report_Extract	Raw data extracted from Washinton Utility Mix Disclosure Report
Year_Disclosure	Aggregation of the raw Utility mix disclosure data by Utility
Year_Fuel_Share	Calculation of the electriciy mix for each utility based on disclosure data and fuel type allocation
EF_Tables	LCI Data extracted from WA-GREET and resource allocation table

WA Utility CI Calculator

- Developed draft WA Utility CI Calculator v0.2a – external to WA-GREET
- Utilizes annual Washington utility mix disclosure report for fuel mix
- Well-to-plug GHG emissions calculated following WA-GREET methodology and emission factors
- Described in detail in the updated supplemental documentation



Electricity CI Calculation in GREET

- CI calculation based on lifecycle – includes:
  - Resource upstream
  - Electricity generation at plant
  - Transmission losses
- Upstream EF specific to each fuel type as modelled in WA-GREET by region
- Generation emissions combines specific fuel use for each fuel type with corresponding power generation technology share and efficiency
  - Specific to a given NERC region as built into WA-GREET
    - Washington is part of WECC region

Electricity CI Calculation in GREET

- Combustion Technology Shares and Power Plant Energy Conversion Efficiencies for GREET Calculation
  - WECC region shown below

Electricity Production: WAMX Region	Combustion Technology Shares for A Given Plant Fuel Type: EVs, GC PHEVs, and Electrolysis	Power Plant Energy Conversion Efficiency (Transportation)
Residual Oil-Fired Power Plants		33.65%
Boiler	72.4%	33.90%
Internal Combustion Engine	15.5%	39.00%
Gas Turbine	12.1%	27.60%
Natural Gas-Fired Power Plants		48.12%
Boiler	6.4%	32.00%
Simple-cycle gas turbine	3.3%	32.80%
Combined-cycle gas turbine	89.2%	51.10%
Internal Combustion Engine	1.1%	34.40%
Coal-Fired Power Plants		34.70%
Boiler	100.0%	34.70%
IGCC	0.0%	40.00%
Biomass Power Plants		22.60%
Boiler	100.0%	22.60%
IGCC	0.0%	40.00%
Nuclear Power Plants		100.0%
Other Power Plants (hydro, wind, geothermal, etc.)		100.0%
Hydroelectric	92.4%	
Geothermal	0.0%	
Wind	7.2%	
Solar PV	0.4%	
Others (Biogenic Waste, Pumped Storage, etc.)	0.0%	

WA Utility Mix Disclosure

- Yearly utility mix disclosure report available through WA Department of Commerce
  - WA Utilities identified by unique “Claimant ID”
  - Raw data available in the calculator on “Report Extract” sheet

Report Year	Customer Served State	Claimant ID	Claimant Name	Fuel Type Category Name	BPA Unspecified Purchases MWh	BPA Claims on Plants MWh	Total BPA MWh	Adjusted WA PacifiCorp	Unspecified Purchases MWh	Plant Claims MWh	Total Unspecified Purchases MWh	Total Claims on Plants (Specified) MWh	Total MWh	Percent Fuel Type Share
2020	WA	1	Alder Mutual Light	Biogas	0	0	0	0	0	0	0	0	0	0.00%
2020	WA	1	Alder Mutual Light	Biomass	2	0	2	0	0	0	2	0	2	0.04%
2020	WA	1	Alder Mutual Light	Coal	76	0	76	0	0	0	76	0	76	1.39%
2020	WA	1	Alder Mutual Light	Geothermal	0	0	0	0	0	0	0	0	0	0.00%
2020	WA	1	Alder Mutual Light	Hydro	97	4,616	4,713	0	0	0	97	4,616	4,714	86.48%
2020	WA	1	Alder Mutual Light	Natural Gas	55	0	55	0	0	0	55	0	55	1.00%
2020	WA	1	Alder Mutual Light	Nuclear	6	595	601	0	0	0	6	595	602	11.04%
2020	WA	1	Alder Mutual Light	Other Biogenic	0	0	0	0	0	0	0	0	0	0.00%
2020	WA	1	Alder Mutual Light	Other Non-Biogenic	2	0	2	0	0	0	2	0	2	0.03%
2020	WA	1	Alder Mutual Light	Petroleum	1	0	1	0	0	0	1	0	1	0.02%
2020	WA	1	Alder Mutual Light	Solar	0	0	0	0	0	0	0	0	0	0.00%
2020	WA	1	Alder Mutual Light	Unknown	0	0	0	0	0	0	0	0	0	0.00%
2020	WA	1	Alder Mutual Light	Waste	0	0	0	0	0	0	0	0	0	0.00%
2020	WA	1	Alder Mutual Light	Wind	0	0	0	0	0	0	0	0	0	0.00%
2020	WA	4	Benton County PUD #1	Biogas	0	0	0	0	0	0	0	0	0	0.00%
2020	WA	4	Benton County PUD #1	Biomass	699	0	699	0	0	0	699	0	699	0.04%
2020	WA	4	Benton County PUD #1	Coal	22,887	0	22,887	0	0	0	22,887	0	22,887	1.27%
2020	WA	4	Benton County PUD #1	Geothermal	0	0	0	0	0	0	0	0	0	0.00%
2020	WA	4	Benton County PUD #1	Hydro	29,257	1,389,416	1,418,673	0	0	13,769	29,257	1,403,185	1,432,442	79.50%
2020	WA	4	Benton County PUD #1	Natural Gas	16,473	0	16,473	0	0	0	16,473	0	16,473	0.91%
2020	WA	4	Benton County PUD #1	Nuclear	1,874	179,185	181,059	0	0	0	1,874	179,185	181,058	10.05%
2020	WA	4	Benton County PUD #1	Other Biogenic	0	0	0	0	0	0	0	0	0	0.00%
2020	WA	4	Benton County PUD #1	Other Non-Biogenic	461	0	461	0	0	0	461	0	461	0.03%
2020	WA	4	Benton County PUD #1	Petroleum	396	0	396	0	0	0	396	0	396	0.02%
2020	WA	4	Benton County PUD #1	Solar	0	0	0	0	0	0	0	0	0	0.00%
2020	WA	4	Benton County PUD #1	Unknown	0	0	0	0	0	0	0	0	0	0.00%
2020	WA	4	Benton County PUD #1	Waste	14	0	14	0	0	0	14	0	14	0.00%
2020	WA	4	Benton County PUD #1	Wind	0	0	0	0	0	147,426	0	147,426	147,426	8.18%

WA Utility CI Calculator

- Raw utility mix disclosure data aggregated by utility

Claimant ID	Claimant Name	Biogas	Biomass	Coal	Geotherm	Hydro	Natural G	Nuclear	Other Biogeni	Other Non-Biogeni	Petroleu	Solar	Unknow	Waste	Wind	Unspecified (Plant)	Unspecified (BPA)	Total
1	Alder Mutual Light	0	0	0	0	4,616	0	595	0	0	0	0	0	0	0	0	239	5,450
4	Benton County PUD #1	0	0	0	0	1,403,185	0	179,185	0	0	0	0	0	0	147,426	0	72,061	1,801,857
5	Benton Rural Electric Assn	0	0	0	0	452,998	0	58,420	0	0	0	0	0	0	0	0	23,495	534,913
6	Big Bend Electric Coop	0	0	0	0	479,324	0	61,815	0	0	0	0	0	0	0	37,344	24,859	603,342
12	City of Blaine	0	0	0	0	68,150	0	8,789	0	0	0	0	0	0	0	0	3,535	80,474
18	Centralia City Light	0	0	37,303	0	199,125	0	20,523	0	0	42	0	0	0	0	0	8,254	265,247
19	Chelan County PUD #1	0	0	0	0	1,663,395	0	0	0	0	24	0	0	0	327	0	0	1,663,746
20	Cheney Light Department	0	0	0	0	112,151	0	14,463	0	0	0	0	0	0	0	8,761	5,816	141,191
21	Chewelah Electric Department	0	0	0	0	17,640	0	2,275	0	0	0	0	0	0	0	0	915	20,830
22	Clallam County PUD #1	0	0	0	0	574,455	0	72,850	0	0	0	0	0	0	0	0	29,298	676,603
23	Clark County PUD #1	0	0	0	0	2,355,224	1,381,142	301,574	0	0	0	0	0	0	140,908	323,575	121,280	4,623,703
26	Clearwater Power (WA)	0	0	0	0	18,639	0	2,404	0	0	0	0	0	0	0	5	965	22,013
30	Columbia Rural Electric Assn (WA)	0	0	0	0	290,733	0	37,494	0	0	0	0	0	0	0	33,063	15,079	376,369
32	Coulee Dam, Town of	0	0	0	0	14,392	0	1,856	0	0	0	0	0	0	0	0	746	16,994
33	Cowlitz County PUD #1	0	67,647	2,622	0	3,156,681	16,590	387,284	1,151	0	127	558	0	0	348,336	266,243	155,752	4,402,991
35	Douglas County PUD #1	0	0	656	0	741,599	5,337	0	0	0	1	292	0	0	0	261,401	0	1,009,286
38	Eatonville Electric Department	0	0	0	0	23,494	0	3,030	0	0	0	0	0	0	0	0	1,220	27,744
39	Elmhurst Mutual Power & Light	0	0	0	0	238,201	0	30,719	0	0	0	0	0	0	0	0	12,354	281,274
41	Ellensburg Electric Division	0	0	0	0	170,796	0	22,027	0	0	0	0	0	0	0	0	8,858	201,681
44	Ferry County PUD #1	0	0	0	0	59,888	0	7,723	0	0	0	0	0	0	0	0	3,106	70,717
46	Franklin County PUD #1	0	0	0	0	893,085	0	113,472	0	0	0	0	0	0	0	28,227	45,633	1,080,417
47	Grays Harbor County PUD #1	0	8,040	0	0	755,205	0	97,394	0	0	0	0	0	0	0	0	39,168	899,807
48	Inland Power & Light	0	0	0	0	843,076	0	108,726	0	0	0	0	0	0	0	50,547	43,726	1,046,075
51	Kittitas County PUD #1	0	0	0	0	94,855	0	12,233	0	0	0	0	0	0	0	185	4,919	112,192
52	Klickitat County PUD #1	0	0	0	0	376,883	0	42,921	0	0	0	0	0	0	0	63,697	17,260	500,761
53	Kootenai Electric Coop	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	Lakeview Light & Power	0	0	0	0	218,245	0	28,146	0	0	0	0	0	0	0	0	11,319	257,710
56	Lewis County PUD #1	0	0	0	0	748,174	0	95,975	0	0	0	0	0	0	59,989	0	38,598	942,736
59	McCleary Light & Power	0	0	0	0	26,063	0	3,361	0	0	0	0	0	0	0	0	1,351	30,775
63	Milton Electric Division	0	0	0	0	48,057	0	6,198	0	0	0	0	0	0	0	0	2,493	56,748
64	Modern Electric Water Company	0	0	0	0	197,048	0	25,412	0	0	0	0	0	0	0	0	10,219	232,679

WA Utility CI Calculator

- Electricity generation sources under utility mix disclosure transformed into GREET resource categories
- Ongoing consultation with Department of Commerce for appropriate allocation

Allocation of Washington Fuel Mix Disclosure Resources Categories to WA-GREET Resources Categories

	Residual oil	Natural gas	Coal	Nuclear power	Biomass	Hydroelectric	Geothermal	Wind	Solar PV
Biogas		1							
Biomass					1				
Coal			1						
Geothermal							1		
Hydro						1			
Natural Gas		1							
Nuclear				1					
Other Biogenic		1							
Other Non-Biogenic	1								
Petroleum	1								
Solar									1
Unknown		1							
Waste	1								
Wind								1	
Unspecified (Plant)		1							
Unspecified (BPA)		1							

WA Utility CI Calculator

- Post-allocation resource mix used to calculate fuel share % for each utility
  - Available on “2020 Fuel Share” sheet

Claimant ID	Claimant Name	Residual oil %	Natural gas %	Coal %	Nuclear power %	Biomass %	Hydroelectric %	Geothermal %	Wind %	Solar PV	Total %
1	Alder Mutual Light	0.00%	4.39%	0.00%	10.92%	0.00%	84.70%	0.00%	0.00%	0.00%	100.00%
85	Asotin County PUD #1	0.00%	4.37%	0.00%	10.93%	0.00%	84.71%	0.00%	0.00%	0.00%	100.00%
109	Avista (WA)	0.75%	45.52%	13.01%	0.00%	5.21%	33.87%	0.00%	1.65%	0.00%	100.00%
4	Benton County PUD #1	0.00%	4.00%	0.00%	9.94%	0.00%	77.87%	0.00%	8.18%	0.00%	100.00%
5	Benton Rural Electric Assn	0.00%	4.39%	0.00%	10.92%	0.00%	84.69%	0.00%	0.00%	0.00%	100.00%
6	Big Bend Electric Coop	0.00%	10.31%	0.00%	10.25%	0.00%	79.44%	0.00%	0.00%	0.00%	100.00%
18	Centralia City Light	0.02%	3.11%	14.06%	7.74%	0.00%	75.07%	0.00%	0.00%	0.00%	100.00%
19	Chelan County PUD #1	0.00%	0.00%	0.00%	0.00%	0.00%	99.98%	0.00%	0.02%	0.00%	100.00%
20	Cheney Light Department	0.00%	10.32%	0.00%	10.24%	0.00%	79.43%	0.00%	0.00%	0.00%	100.00%
21	Chewelah Electric Department	0.00%	4.39%	0.00%	10.92%	0.00%	84.69%	0.00%	0.00%	0.00%	100.00%
12	City of Blaine	0.00%	4.39%	0.00%	10.92%	0.00%	84.69%	0.00%	0.00%	0.00%	100.00%
22	Clallam County PUD #1	0.00%	4.33%	0.00%	10.77%	0.00%	84.90%	0.00%	0.00%	0.00%	100.00%
23	Clark County PUD #1	0.00%	39.49%	0.00%	6.52%	0.00%	50.94%	0.00%	3.05%	0.00%	100.00%
26	Clearwater Power (WA)	0.00%	4.41%	0.00%	10.92%	0.00%	84.67%	0.00%	0.00%	0.00%	100.00%
30	Columbia Rural Electric Assn (WA)	0.00%	12.79%	0.00%	9.96%	0.00%	77.25%	0.00%	0.00%	0.00%	100.00%
161	Consolidated Irrigation District #19	0.00%	4.42%	0.00%	10.91%	0.00%	84.67%	0.00%	0.00%	0.00%	100.00%
32	Coulee Dam, Town of	0.00%	4.39%	0.00%	10.92%	0.00%	84.69%	0.00%	0.00%	0.00%	100.00%
33	Cowlitz County PUD #1	0.00%	9.99%	0.06%	8.80%	1.54%	71.69%	0.00%	7.91%	0.01%	100.00%

Washington Utility CI Calculation

- Aggregated upstream EF for each fuel type from extracted WA-GREET using 2-WAMX region
- Power generation emissions directly modelled in the calculator, following WA-GREET
  - Uses WECC region shares and efficiencies
- All factors extracted from WA-GREET available on EF-Tables sheet in the calculator

WA Utility CI Calculator

- Allows user to select of a specific Utility or a user-defined mix for CI calculation
  - Selection available on Utility_CI sheet
  - Use of user-defined mix allowed at discretion of Department of Ecology and provisions of the regulation

1) Selection of Washington Utility or User Defined mix	1	1 - Washington Utility	
		2 - User Defined Mix	
1.1) Selection of the WA Utility ID for CI Results			
Utility Claimant ID	1	*List of all Utility IDs and names available on Report Extract sheet	
Name of the Selected Utility Mix	Alder Mutual Light		
2) Electric Generation Mix: Data Table	**Active Case for CI Calculation**		
	Alder Mutual Light	Alder Mutual Light	User Defined Mix
Residual oil	0.00%	0.00%	0.10%
Natural gas	0.00%	0.00%	20.46%
Coal	4.39%	4.39%	10.22%
Nuclear power	0.00%	0.00%	4.75%
Biomass	10.92%	10.92%	0.45%
Others	84.70%	84.70%	64.03%

Washington Utility CI Results

- Results are shown in disaggregated form similar to WA-GREET
  - Example results shown below, available on Utility_CI sheet

2) Electric Generation Mix: Data Table	Active Case for CI Calculation
	Alder Mutual Light
Residual oil	0.00%
Natural gas	0.00%
Coal	4.39%
Nuclear power	0.00%
Biomass	10.92%
Others	84.70%

3) CI Results for: 1: Alder Mutual Light

Details Breakdown of CI for Electricity Resources	Residual Oil	NG	Coal	Biomass	Nuclear	Other renewable energy sources	Total, g/MMBtu	Electricty Prod For Stationary Use	Final WTW CI
VOC	0.00	0.00	1.02	0.53	0.00	0.00	1.546	4.69	
CO	0.00	0.00	0.40	2.22	0.00	0.00	2.623	159.64	
CH4	0.00	0.00	20.12	2.43	0.00	0.00	22.543	16.53	
N2O	0.00	0.00	0.00	0.01	0.00	0.00	0.017	2.41	
CO2	0.00	0.00	208.18	1067.53	0.00	0.00	1275.707	13211.42	
Convert to gCO2e/MMBtu	0.00	0.00	716.23	1137.20	0.00	0.00	1853.429	14608.30	
g/MJ	0.00	0.00	0.68	1.08	0.00	0.00	1.76	13.85	15.60
g/kWh							6.32	49.85	56.17

Comments and Questions

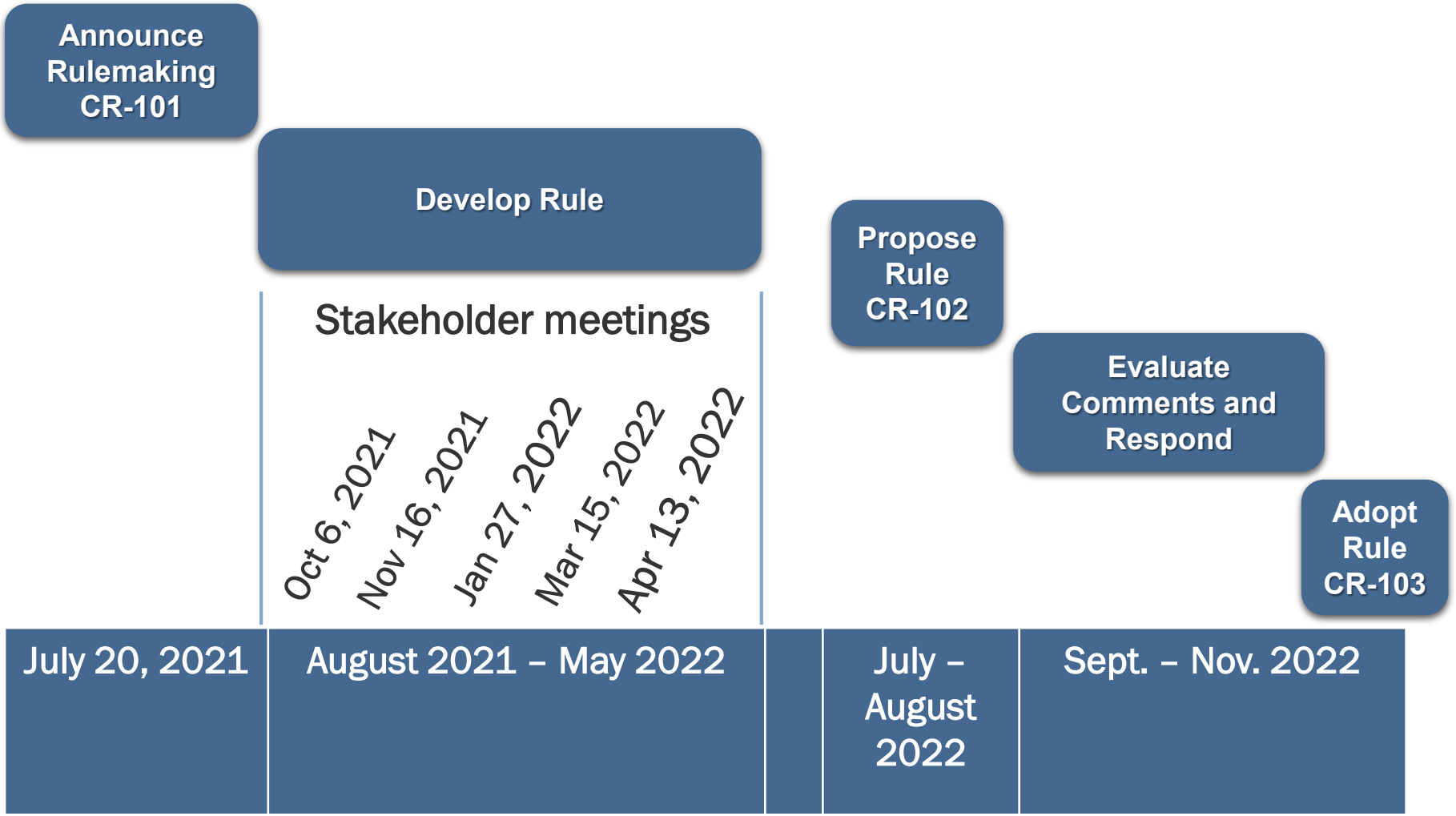
Please be brief
so everyone has a chance to comment.

5-Minute Break

Rulemaking Timeline & Program Fees

Rachel Assink

Rulemaking Timeline



Program Fees: RCW 70A.535.130

- Ecology may require that program participants pay a fee
- Must adopt rules to establish a process to determine payment schedule and fee amount
- Fee costs must equal, but not exceed, projected costs for developing and implementing the program

Draft Program Fee Approach: 2023

- Participation fee only (all program participants)
  - 70-80% of annual program cost paid by deficit generators
  - 20-30% of annual program cost paid by credit generators
- Fees collected during registration in Q1, 2023

Draft Program Fee Approach: 2024

- Flat participation fee + deficit generation fee
- Participation fee: Same for credit and deficit generators
- Deficit generation fee: Based on deficits generated in 2023 from quarterly reports
- Timeline
  - February 2024: Post fee schedule
  - February-March 2024: 30-day public comment period on fee schedule
  - April 2024: Send invoices

Draft Program Fee Approach: 2025 and Beyond

- Flat participation fee + deficit generation fee
- Participation fee: Same for both credit and deficit generators
- Deficit generation fee: Based on deficits generated for the entire previous year from annual report
- Timeline
  - March 31: Annual compliance reports submitted
  - April: Post fee schedule
  - April–May: 30-day public comment period on fee schedule
  - June: Send invoices

Draft Rule Language

Debebe Dererie

Agenda

- Credit and deficit basic
- Transacting credits
- Fuels to include in credit and deficit calculation
- Calculating credits and deficits
- Demonstrating compliance
- Credit clearance market
- Advance crediting
- Calculating capacity-based credits for ZEV infrastructure

Credit and Deficit Basic

- Carbon intensities:
  - Regular
  - Provisional
  - Temporary
  - Substitute
- Fuel quantities
- Compliance period
- Metric tons of CO_2e equivalent
- Deficit & credit generation
- Mandatory retirement of credits
- Credit retirement hierarchy

Transacting Credits

- Roles and limits of registered parties
- Credit transfers
- Credit seller requirements
- Credit buyer requirements
- Voiding Credits
- Aggregator
- Illegitimate credits
- Prohibited credit transfer

Fuels to Include in Credit and Deficit Calculation

- Fuels included
- Fuels exempted
- Voluntary inclusion
- When fuels are exported from Washington
- Alternative jet fuels

Calculating Credits and Deficits

- General calculation method
- Fixed guideway vehicles and e-forklifts
- Residential electric vehicle charging
- Incremental credit
  - Renewable Energy Certificates
- Demonstrating compliance

Demonstrating Compliance

- Compliance Demonstration:
  - Annual compliance report
  - Retired credit = compliance obligation
- Compliance obligation = Deficit generated + Deficit carried over
- Credit balance = (CreGen + CreAcq + CreCO) – (CreRet + CreSol + CreOH)
- Small deficits ≤ 5 percent
- Extended credit acquisition period
- Non-small deficits – CCM

Credit Clearance Market

- General
- Maximum price
- Acquisition of credits
- Selling credits
- Operation of the CCM
- Deficits – amended compliance report
- Root cause analysis

Advance Crediting

- General provisions
- Eligibility
- Applications for advance credits
- Approval
- Issuance of advance credits
- Payback period
- Reporting requirements
- Overall limitation on advance credit

Credits for ZEV Infrastructure

- Pathway eligibility for HRI and FCI - public access, due date
- Application requirements
  - Capacity based on potential demand, capacity limits
- Application approval process – 2.5% of deficits
- Generation of credits – CI and renewable content threshold
- Calculation of credits – cap to credit revenue
- Reporting and recordkeeping requirements
  - Cost and revenue
- Applications for expanded HRI/FCI refueling capacity

Comments and Questions

Please be brief
so everyone has a chance to comment.

Next Steps & Wrap Up

Rachel Assink

Comment Submittal & Next Steps

End of informal public comment period:

April 25, 2022

Comments online and read others' comments:
https://aq.ecology.commentinput.com/?id=DpgZ3

Next Steps

Propose rule: July 2022

Formal public comment period:

July – August 2022

For More Information

Learn More

- **Visit the rulemaking web page:**
  https://ecology.wa.gov/Regulations-Permits/Laws-rules-rulemaking/Rulemaking/WAC-173-424-455

Stay Informed

- **Join the email list:**
  https://public.govdelivery.com/accounts/WAECY/subscriber/new?topic_id=WAECY_142

Contacts

DEPARTMENT OF ECOLOGY
State of Washington

Rulemaking Lead
Rachel Assink
rachel.assink@ecy.wa.gov
425-531-3444

Technical Lead
Abbey Brown
abbey.brown@ecy.wa.gov
360-819-0158

Fuel Pathways Specialist
Debebe Dererie
debebe.dererie@ecy.wa.gov
360-688-8103

Climate Policy Section Manager
Joel Creswell
joel.creswell@ecy.wa.gov
360-972-5035

Outreach & Engagement Specialist
Janée Zakoren
janee.zakoren@ecy.wa.gov
360-280-7128

Thank you for attending