

Ozone Depleting Substances Technical Working Group

Meeting #2: April 23rd



Agenda – Meeting #2

- Regulatory context
- Topic #1 Update GWP values
- Topic #2 Revise 10 year emissions rates for refrigerants
- Topic #3 Revise 10 year emissions rates for foams
- Wrap up and next steps
 - Next meeting: May 17th
- Public comment opportunity



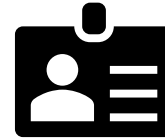
Zoom tips and tricks



Panelists please keep yourself muted unless you're speaking.



For panelists please keep your video on as bandwidth allows.



Please rename yourself with your affiliation: Click on 'Participants,' hover over your name Click 'More' then 'Rename.'

Reminder: Role of this Working Group

- This working group is not tasked with making consensus recommendations changes to Ecology rule or adopted protocols
- Ecology will consider multiple sources and perspectives, including the input collected through this working group, when deciding how to proceed with changes to this protocol
- Input provided by working group members, even if unanimous, should not be considered an indicator of the changes Ecology may or may not make

Regulatory Context

- Offset projects must:
 - Result in greenhouse gas reductions or removals that:
 - Are real, permanent, quantifiable, verifiable, and enforceable; and
 - Are in addition to greenhouse gas emission reductions or removals otherwise required by law and other greenhouse gas emission reductions or removals that would otherwise occur; (RCW 70A.65.170)

Regulatory Context: Project Baselines

- "Project baseline" means, in the context of a specific offset project, a conservative estimate of business-as-usual GHG emission reductions or GHG removal enhancements for the offset project's GHG emission sources, GHG sinks, or GHG reservoirs within the offset project boundary. (WAC 173-446-020)

Washington's HFC Regulations (RCW 70A.60; WAC 173-443)

- Prohibits use of specific HFC's (WAC 173-443-040) in new products and equipment, with some exemptions (WAC 173-443-050)
- Requires owner/operator registration of systems over specific charge and GWP thresholds (WAC 173-443-115)
- Leak inspections are required for systems over full charge and GWP thresholds (WAC 173-443-155)
 - Maximum leak rates:
 - 16% for retail food refrigeration/cold storage
 - 24% for industrial process refrigeration
 - 8% for air conditioning

Direct Environmental Benefits (DEBs)

- All Offsets issued by Ecology must provide Direct Environmental Benefits to the State (RCW 70A.65.170(2)(a))
- All in-state projects are considered to provide DEBs to the State
- Out-of-state projects may apply to Ecology to receive DEBs designation, as in California's market
- ODS projects are considered to provide DEBs to the state of Washington if a portion of destroyed material are sourced from within Washington state

Environmental Justice – in CCA Offsets Program

- In CCA offsets are “under the cap”
 - The number of offsets used in the program is subtracted from the number of available allowances in the following year to ensure attainment of emissions targets
- Ecology has the authority to reduce offset usage limits for entities that contribute significantly to the cumulative air pollution burden in overburdened communities
- To maximize offset use, entities must source a portion of their offsets used for compliance from projects on Tribal lands
- Offset projects must demonstrate to Ecology that they will not incur significant adverse environmental impacts after mitigation

Environmental Justice – in Rulemaking Process

- An Environmental Justice Assessment (EJA) will be completed as part of this rulemaking process
- In addition to topic specific technical working groups Ecology will convene an Environmental Justice Working Group to inform the EJA and rulemaking decisions
- Any rule changes will be proposed in coordination with the Environmental Justice Council (RCW 70A.65.040(2)(a)(i))

Discussion

- Questions/comments/clarifications?

Structure of meeting

- Ecology will briefly present topic
- Ecology will ask for any additional context, considerations, or clarification related to the topic
- Ecology will pose discussion questions to working group members
- After the meeting Ecology will distribute a very brief survey to quantitatively capture working group member input on each topic

Topic #1

Topic: Update GWP values to AR5

- Current: Protocol uses IPCC AR4 GWP values
- Considered change: Use IPCC AR5 (as used in ACR and Verra protocols)
 - GWP values were largely revised slightly down for relevant gases from AR4 to AR5
- Alternatives:
 - Consider adopting a schedule for updating these values to AR6 values
 - Consider retaining IPCC AR4 values to retain alignment with EPA Reporting values
 - Consider adopting Ecology's GWP values in HFC regulation, which are a combination of AR4 and AR5

Ecology's adopted GWP values

- In Washington's HFC Rule (WAC 173-443)
 - "Global warming potential," "GWP," "global warming potential value," or "GWP value" means 100-year GWP value as it appears in WAC [173-441-040](#), and if not contained in WAC [173-441-040](#), then the GWP value means the 100-year GWP value published by the Intergovernmental Panel on Climate Change (IPCC) in its Fifth Assessment Working Group 1 Report (AR5) (IPCC, 2013).
 - WAC 173-441-040 doesn't provide values for HCFC's and CFC's, so for the purposes of WAC 173-443 AR5 values would be used for these substances
 - HFC's are included in WAC 173-441-040, and reflect AR4 values

GWP Values in 2014 ODS Protocol

ODS Refrigerants	AR4 (Current)	AR5	Percent Change
CFC-11	4,750	4,663	-1.8%
CFC-12	10,900	10,239	-6.1%
CFC-13	14,400	13,893	-3.5%
CFC-113	6,130	5,824	-5%
CFC-114	10,000	8,592	-14.1%
CFC-115	7,370	7,665	+4.0%

GWP Values

ODS Foams	AR4 (Current)	AR5	Percent Change
CFC-11	4,750	4,663	-1.8%
CFC-12	10,900	10,239	-6.1%
HCFC-22	1,810	1,764	-2.5%
HCFC-141b	725	782	+7.9%

GWP Value Sources

- Sources for this change:
 - ACR ODS 2.0
 - VERRA VM0016 (adopted in VCS Standard 4.5)
 - CARB 2021 Taskforce report

Change logistics: Topic 1

- Updating these values would require a change to table B.1 and B.2 of the adopted protocol
- Substitute emissions factor may also need to be updated
 - Calculations for substitute emissions are listed in CAR 2.0 protocol
- If a scheduled update to AR6 values is adopted additional changes will be required

Discussion: Topic 1 Context

- What additional context or considerations related to this topic should Ecology be aware of?

Discussion: Topic 1 AR4 to AR5

- Should Ecology adopt AR5 GWP values? Why or why not?
 - Are there any cases where AR5 values for specific substances or categories of substances should *not* be adopted?
- Should Ecology include a scheduled conversion to AR6 values?

Discussion: Topic 1 Programmatic Goals

- Does this change contribute to Ecology's programmatic goals of this rulemaking:
 - Reflect advances in policy and scientific understanding
 - Remove unnecessary project development barriers, inefficiencies, and exclusions
 - Increase methodological rigor

Topic #2

Revise 10 year emissions rates - refrigerants

- Current: Offsets are credited based on estimated 10 year emissions of ODS, absent destruction
- Considered change: Revise 10 year emissions rates to reflect more recent data
- Alternatives:
 - Use alternative source(s) to calculate 10 year emissions rates of ODS

10-year Cumulative Emissions Values - equation

(GWP of ODS Destroyed x 10-year cumulative emissions rate)

- Project emissions

= Offsets Issued

Example:

(10,000 CO₂e CFC-11 x 89%)

- 500 CO₂e Project Emissions

=8,400 Offsets Issued

10-year Cumulative Emissions Values - Vintaging Model

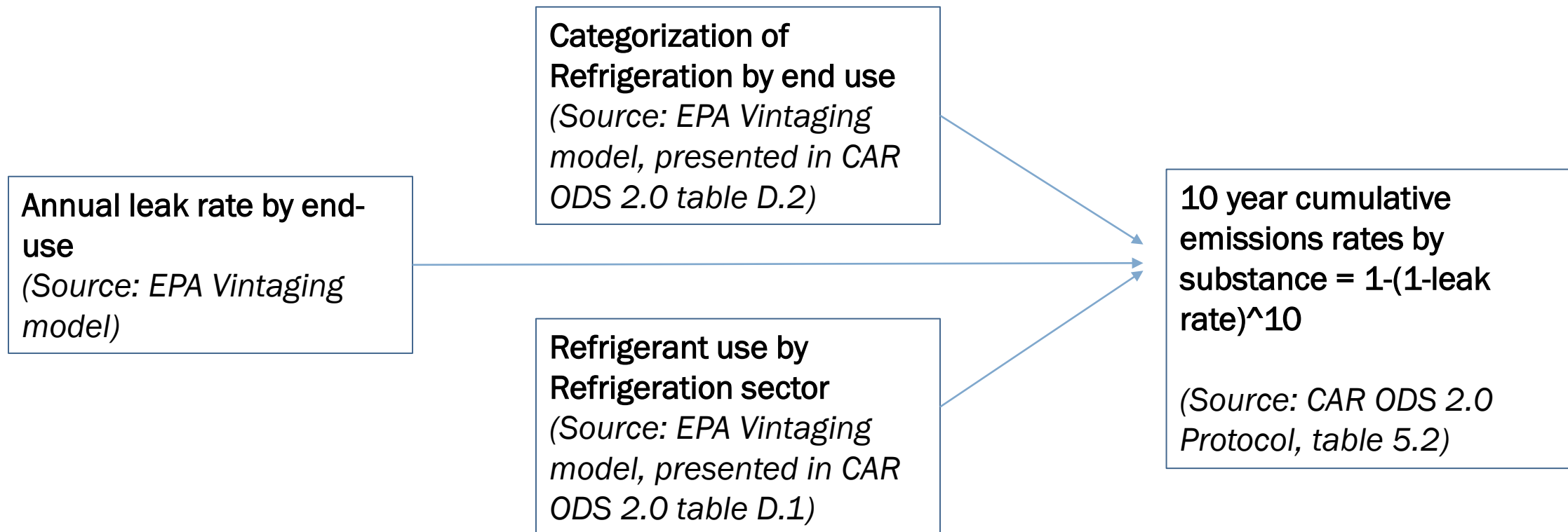
- Values of refrigerants are based on leak rate outputs of EPA's Vintaging Model
 - Vintaging model is not publicly available, but appears to have been updated in 2018 (or more recently)
- EPA has published outputs of this model in their reports, most recent update in 2022
<https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2020>

10-year Cumulative Emissions Values

ODS Refrigerants	10-year Cumulative Emissions Rate (Current)
CFC-11	89%
CFC-12	95%
CFC-13*	61%
CFC-113*	89%
CFC-114	78%
CFC-115	94%

*Leak rates for these substances were not available in EPA Vintaging model at time of output, alternative source from California's refrigerant management program was used for these substances

10-year Cumulative Emissions Values Calculation



Considered revisions: Topic 2

- Option 1: Update 10 year emissions rate using most recent output of EPA Vintaging model - *inputs from internal EPA model will be needed to replicate calculations*
- Alternative: Use alternative source(s) for 10 year emissions rates
 - For example: Ecology's established maximum leak rates for systems with a full charge >50 lbs (WAC 173-443-155):
 - 16% for retail food refrigeration/cold storage
 - 24% for industrial process refrigeration
 - 8% for air conditioning

Treatment in other protocols: Topic 2

- Reviewing and revising emissions rates was CARB taskforce recommendation
- ACR 2.0 ODS protocol removes 10-year cumulative emissions rates altogether (effectively assuming 100% leakage)
- Verra VM0016 uses leak rates in CAR ODS protocol (which are also used in current CARB protocol)

Change logistics: Topic 2

- Updating these values would require a change to table b.1 of the adopted protocol
- Significant calculations would be required to update these inputs and would require adequate review
- Recalculation would be required for **any new gases considered through this revision**

Discussion: Topic 2 Context

- What additional context or considerations related to this topic should Ecology be aware of?

Discussion: Topic 2 Alternatives

- Are there alternative/additional sources that Ecology should consider to update these values?

Discussion: Topic 2 Baseline

- Leak rates for refrigerant ODS use a baseline of continued use in equipment, rather than disposal
 - What sources should Ecology consider to determine which baseline most closely resembles a conservative business-as-usual scenario?
 - Have industry practices or unit economics related to this issue changed since this protocol was adopted by CARB in 2014?
 - Please share your perspective on which approach may be more appropriate

Discussion: Topic 2 Programmatic Goals

- Does this change contribute to Ecology's programmatic goals for this rulemaking:
 - Reflect advances in policy and scientific understanding
 - Remove unnecessary project development barriers, inefficiencies, and exclusions
 - Increase methodological rigor

Topic #3

Revise 10 year emissions rates - Foams

- Current: Offsets are credited based on estimated 10 year emissions of foam blowing agents, absent destruction
- Considered change: Revise 10 year emissions rates to reflect more recent data and/or an alternative source
- Alternatives:
 - Revise 10 year emissions rates to reflect reuse rather than disposal

10-year Cumulative Emissions Values – Foams

ODS Foam	10-year blowing agent emissions rate
CFC-11	20%
CFC-12	36%
HCFC-22	65%
HCFC-141b	29%

10-year Cumulative Emissions Values Baselines

- Values for foam are based on a research by Scheutz, et al (2007) and Fredenslund, et al (2005)
- Leak rate for foams accounts for release during shredding, release during compaction, and release in anaerobic landfill conditions
- Leak rate for foams are based on a baseline of disposal, not recovery

Foam Emissions Rates in current protocol

Table 5.4. Emissions from Shredding and Landfilling ODS Foam Blowing Agents

ODS Blowing Agent	Percent of ODS Blowing Agent Released During Shredding ^a (set to zero for demolition debris)	Percent of ODS Blowing Agent Released During Compaction ^b	Percent of Remaining ODS Blowing Agent Released During Anaerobic Conditions ^c	Percent of Released ODS Blowing Agent Not Degraded in Anaerobic Landfill Conditions ^c
CFC-11	24%	19%	35%	5%
CFC-12	24%	19%	52%	40%
HCFC-22	24%	19%	100%	57%
HCFC-141b	24%	19%	41%	29%

^a Scheutz, C., et al. (2007). Release of fluorocarbons from insulation foam in home appliances during shredding. *Journal of the Air & Waste Management Association*, 57: 1452-1460.

^b Fredenslund, A., et al. (2005). Disposal of Refrigerators-Freezers in the U.S. : State of the Practice. *Technical University of Denmark*.

^c Scheutz, C., et al. (2007). Attenuation of insulation foam released fluorocarbons in landfills. *Environmental Science & Technology*, 41: 7714-7722.

Considered revisions: Topic 3

- Option 1: Update 10 year emissions rates to reflect more recent sources (ACR 1.2 Protocol), as available, and/or outputs of the EPA Vintaging model, as available
- Alternative: Revise foam emissions calculations to reflect recovery and reuse, rather than landfill disposal (CARB Taskforce recommendation)

Treatment in other protocols: Topic 3

- Reviewing and revising emissions rates was CARB taskforce recommendation, as well as reconsidering baseline scenario for foams
- ACR 2.0 ODS protocol removes 10-year cumulative emissions rates altogether (effectively assuming 100% leakage)
 - ACR 1.2 ODS protocol significantly revises foam cumulative emissions calculations
- Verra VM0016 uses leak rates in CAR ODS protocol (which are also used in current CARB protocol)

Change logistics: Topic 3

- Updating these values would require a change to table B.2
- Significant calculations would be required to update these inputs and would require adequate review
- Recalculation would be required for any new gases considered through this revision

Discussion: Topic 3 Context

- What additional context or considerations related to this topic should Ecology be aware of?

Discussion: Topic 3 Alternative Sources

- If pursuing Option 1 (updating figures, consistent with a baseline of disposal) which alternative sources would you recommend that Ecology pursue?
 - Literature cited in ACR 1.2 ODS protocol
 - EPA Vintaging model
 - Other

Discussion: Topic 3 Baselines

- A key consideration for this calculation is whether the baseline use these substances (absent destruction) is **disposal** or **use/recovery/reuse**
 - What sources should Ecology consider to determine which baseline most closely resembles a conservative business-as-usual scenario?
 - Have industry practices or unit economics related to this issue changed since this protocol was adopted by CARB in 2014?
 - Please share your perspective on which approach may be more appropriate

Discussion: Topic 3 Programmatic Goals

- Does this change contribute to Ecology's programmatic goals for this rulemaking:
 - Reflect advances in policy and scientific understanding
 - Remove unnecessary project development barriers, inefficiencies, and exclusions
 - Increase methodological rigor



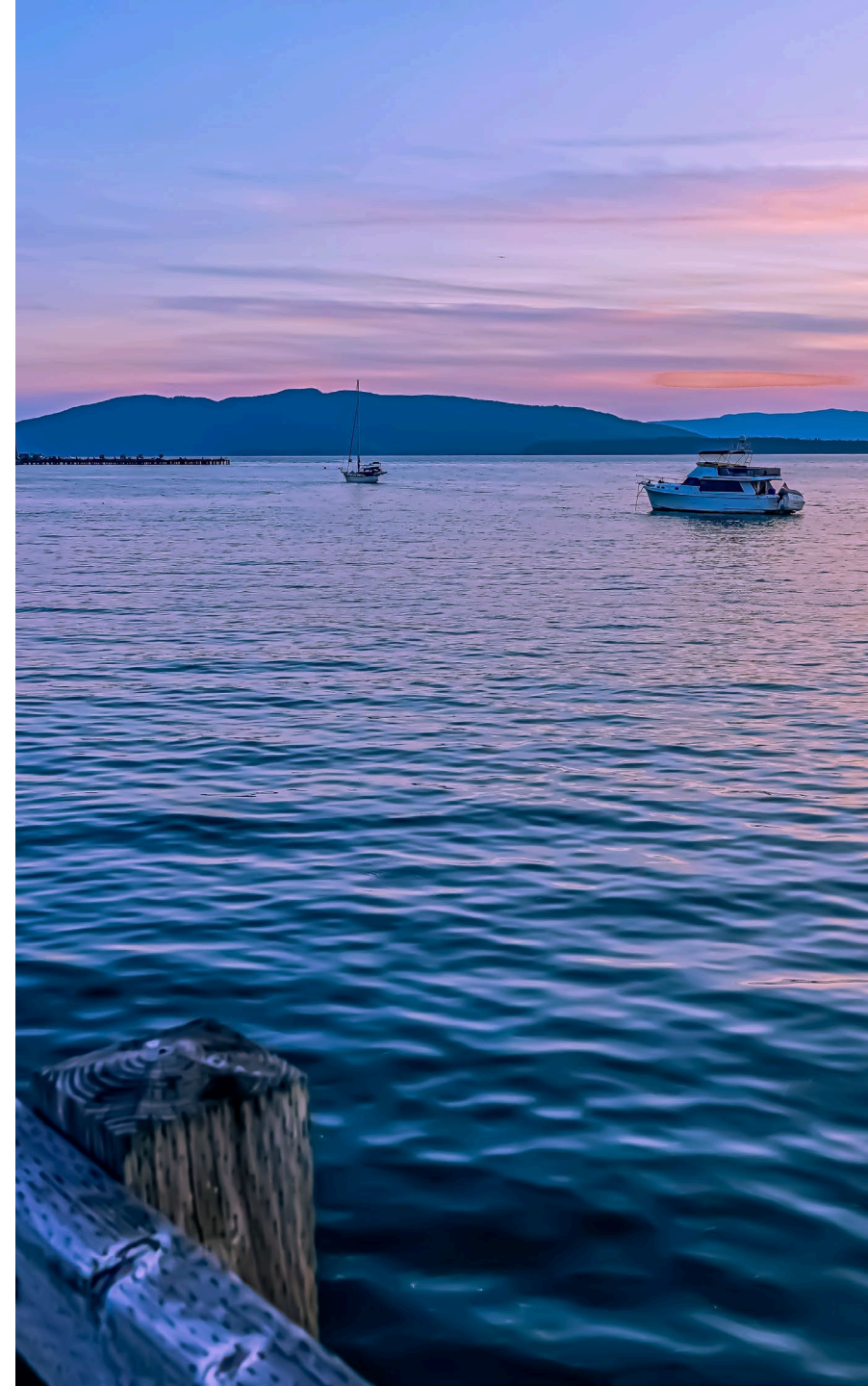
Next steps

- Review summary notes for Meeting #2
 - Respond to brief poll on topics discussed in today's meeting
- Meeting #3 is Friday, May 17th and 8:00 am PT
- Topics for Meeting #3
 - Substitute emissions calculations
 - ODS sourced from federal government
 - Invalidation liability restriction

Public Comment Opportunity

Guidelines for providing public comment

- Up to two minutes per person
- Host will unmute you and begin timer
- Please keep the comments related to offsets and ozone depleting substances
- Ecology will not respond to comments in this meeting
- To submit written comments, use our [digital comment platform](#)
- Please use “raise hand” button to indicate that you wish to provide a comment



Thank you!

Contact:

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