



Washington's Greenhouse Gas Reporting Rule
WAC 173-441
October 2009 Workshops



Agenda

- Overview of mobile source reporting
- On-road motor vehicle fleet reporting
- Nonroad mobile source reporting
 - Fleet of marine vessels example
- Questions and Discussion



Reporting Mobile Sources

Fleets of on-road motor vehicles:

- Passenger cars, SUVs, vans, buses, trucks, and other motor vehicles licensed to operate on roads in Washington
- Subject to the 2,500 MT CO₂e direct emissions threshold

Nonroad mobile sources:

- Fleets of marine vessels
- Fleets of rail equipment
- Fleets of aircraft (instate flights only starting in 2012)
- Vehicles that operate within a single site are part of the site
- Subject to the 10,000 MT CO₂e direct emissions threshold (25,000 MT CO₂e in 2009)

Other mobile sources not reported

Fleets

- All mobile sources of the same type that operate in Washington are grouped together as a fleet:
 - Fleet of on-road motor vehicles
 - Fleet of marine vessels
 - Fleet of rail equipment
 - Fleet of aircraft
- All emissions in state, regardless of base location
- Thresholds applied separately to each fleet
- If mobile source operates exclusively within a site, then part of that site
 - Except for rail equipment



Mobile Source Emissions

Direct emissions (applied to threshold):

- Mobile combustion of fuels:
 - Fleet tailpipe emissions
 - Carbon dioxide, methane, nitrous oxide
- Auxiliary systems:
 - Generators, APUs, misc
- Fugitive emissions:
 - Refrigerant leaks from air conditioning or refrigeration units
 - HFCs, PFCs, CO₂, etc

Indirect emissions (after threshold):

- Associated with the purchase of electricity, heating, cooling, or steam
- Shore power, electric trains, etc
- Does not apply to fleets of on-road motor vehicles



Approximate Fuel Use to Trigger Thresholds

Fleets of nonroad mobile sources

Fuel Type	Approximate Fuel to Meet Threshold 10,000 MT CO ₂ e (2010+)	Approximate Fuel to Meet Threshold 25,000 MT CO ₂ e (2009)	Units / yr
Gasoline	1,120,000	2,800,000	Gallons
Diesel	980,000	2,460,000	Gallons
Residual oil (#6)	846,000	2,100,000	Gallons
Jet fuel	1,000,000	2,500,000	Gallons
Natural Gas	180,000,000	457,000,000	Standard Cubic feet



Approximate Fuel Use to Trigger Thresholds

Fleets of on-road mobile sources (2,500 MT CO₂e threshold)

Fuel Type	Approximate Fuel to Meet Threshold	Units / yr
Gasoline	280,000	Gallons
Diesel	240,000	Gallons



EPA Upstream Reporting

- EPA rule uses upstream reporting, not fleet reporting
- Vehicle and engine manufacturers
 - Test and report CO₂, CH₄, N₂O, and HFC factors
- Upstream fuel reporting by producers, importers, and exporters
 - Petroleum products
 - Natural gas
 - Coal based liquids
 - CO₂
 - Industrial GHG – fluorinated gasses and N₂O
 - Coal (part of proposed rule, but delayed in final rule)



EPA Upstream Petroleum Reporting

- Gasoline, kerosene, distillates, residuals, lubricants, asphalt, and other products
- Refiners = no threshold, report everything
- Importers and exporters = 25,000 MT CO₂e threshold
- Report CO₂ that would result from complete combustion or oxidation
- Refiners report feedstocks
- Report any biomass co-processed or blended with product
- Default factors, measured density and carbon content, or combination



Fleet of On-Road Motor Vehicles

Reporting Steps

1. Determine organizational boundaries
2. Limit to in-state emissions
3. Collect data
4. Separate biomass emissions
5. Calculate emissions
6. Interpret results
7. Self certification
8. Submit report

Example using Company X emissions



1: Organizational Boundaries

- One or more of the following conditions can establish operational control:
 - Authority to introduce and implement operational policies
 - Holding an operating license usually gives this authority
 - Holding environmental licenses or permits for the source
 - Rentals of less than 1 year reported by rental agency

- Draft Rule Section WAC 173-441-050



1: Organizational Boundaries – Example

- Company X owns and operates passenger car fleet (375 vehicles)
- Company X owns and operates interstate trucking fleet (50 vehicles)
- Company X has operational control of small owner-operator fleet with lease agreement (8 vehicles)



2: Limiting to In-State Emissions

- Only count emissions that occur in Washington state
- All vehicles in organizational boundaries that operate in Washington are part of fleet – not site based
- Draft Rule Section WAC 173-441-080



2: Limiting to In-State Emissions

Three methods available to determine if in-state:

- Option 1: mileage location
- Option 2: fueling location
- Option 3: vehicles licensed in Washington

Choosing options:

- Can choose and combine Options 1 and 2
- Option 3 only available to rental organizations
- Methods must be applied consistently



2: Limiting to In-State Emissions – Example

- Passenger cars (gasoline):
 - Option 2: based on fueling location
 - Purchase fuel at public pumps using fuel cards
 - 120,000 gallons (80%) fueled in Washington

- Trucking (diesel and biodiesel):
 - Option 1: based on mileage in Washington
(similar mileage tracking to IRP/IFTA program)
 - 60% of miles in Washington
(2,784,000 miles in WA / 4,640,000 total miles = 60%)



Calculating Emissions

- Methodologies set by the rule
 - Multiple methods to choose from
 - Based on TCR and IPCC methodologies
 - Tiered system of varying complexity
 - Each gas calculated separately
 - Required data depends on method chosen
-
- Draft Rule Section WAC 173-441-110



Tiers

CO₂ Emissions

Tier	Data	Factor
A1	Fuel use	<ul style="list-style-type: none"> ● Measured carbon content and fuel density or ● Measured carbon content and heat content
A2	Fuel use	<ul style="list-style-type: none"> ● Measured heat content and default carbon content or ● Measured carbon content and default heat content
B	Fuel use	Default factors by fuel type
C	Fuel use estimated by mileage	Default factors by fuel type

CH₄ & N₂O Emissions

Tier	Data	Factor
A	Mileage	Default factors based on vehicle type and technology
B	Mileage	Default factors based on vehicle type and model year
C	Mileage estimated by fuel use	Default factors based on vehicle type and technology or model year

HFC Emissions

Tier	Data
A	Mass balance
B	Simplified mass balance
“D”	Screening method



Calculating Emissions

- Basic and most common method covered here:
 - CO₂: Tier B – fuel use and default emission factors
 - CH₄ and N₂O: simplified estimation method
 - HFCs: TCR screening method
- Ecology provides calculation tool for basic method
- Methods available for organizations that only track mileage
- Report submission form will include calculations

3: Collecting Data

- Will need:
 - Total amount of fuel used in Washington
 - Fuel values must be reported separately by fuel type: gasoline, diesel, biodiesel, etc
 - Number of vehicles with air conditioning units
 - Number of decommissioned AC units
- If necessary:
 - Fuel use and/or refrigerant information for any auxiliary power units (APUs), cooling systems, or other devices



3: Collect Data – Example

Fuel Type	Gallons Used	% in Washington	Adjusted Fuel Use (gallons)
Gasoline	150,000	80%	120,000
Diesel	500,000	60%	300,000
Biodiesel (B20)	300,000	60%	180,000

Fugitive Sources	Units	Decommissioned Units	% in Washington
AC Units	433	30	77%
Reefer Trailers	15	2	60%

4: Separate Biomass Emissions

- If biomass portion of fuel is greater than 50%, multiply fuel volume by percentage and report as separate fuels
 - Example: 1,000 gallons of 80% biodiesel, 20% diesel mix: reported as 800 gallons biodiesel, 200 gallons diesel
- If biomass portion of fuel is less than 50%, reporter can choose to report by percentage or report all fuel use as fossil fuel
 - Example: 1,000 gallons of 80% diesel, 20% biodiesel mix: reported as 1,000 gallons diesel



4: Separate Biomass Emissions – Example

Fuel Type	% Biomass	Fuel Used in Washington (gal)	Adjusted Fuel Use (gal)
Gasoline	0%	120,000	120,000
Diesel	0%	300,000	444,000
Biodiesel	20%*	180,000	36,000

* Assume 80% of biodiesel is petrodiesel.



5a: CO₂ Calculations

- CO₂: Tier B – fuel use and default emission factors
- From TCR GRP Chapter 13: Direct Emissions from Mobile Combustion
- Other methods require more data including:
 - Measured fuel characteristics (carbon and/or heat content)
 - Mileage and fuel economy of each vehicle



5a: CO₂ Calculations – Example

Fuel Type	Adjusted Fuel Use (gal)	Emission Factor (kg CO ₂ / gal)	CO ₂ Emissions (MT CO ₂)	CO ₂ Emissions (MT CO ₂ e)
Gasoline	120,000	8.81	1,057	1,057
Diesel	444,000	10.15	4,507	4,507
Biodiesel	36,000	9.46	341	341
Total	NA	NA	5,904	5,904

- Adjusted Fuel Use x Emission Factor / 1,000 = CO₂ Emissions
- CO₂ Emissions x GWP = CO₂e Emissions
- GWP for CO₂ = 1

Simplified Estimation Methods

- A simplified approach to calculate small emissions
- Use TCR as a guideline
 - <http://www.theclimateregistry.org/downloads/GRP.pdf>
 - Chapter 11, pg 58
- Up to 5% of total emissions or 10,000 MT CO₂e, whichever is less



5b & c: CH₄ and N₂O Calculations

- Simplified estimation method
- Fuel use and default emission factors
- Adapted from 2006 IPCC Guidelines for National Greenhouse Gas Inventories Vol.2 Table 2.2
- Other methods require more data including:
 - Mileage of each vehicle
 - Individual vehicle emissions control technology or model year
 - Fuel economy for each vehicle



5b & c: Simplified Estimation Method CH₄ and N₂O Emission Factors

Fuel	CH ₄ Factor (kg/TJ)	N ₂ O Factor (kg/TJ)	Heat Content (mmBTU / bbl)
Gasoline	3	0.6	5.23
Diesel	3	0.6	5.83
Biodiesel	3	0.6	5.36
Ethanol	3	0.6	3.54
Liquefied Petroleum Gas (LPG)	1	0.1	3.86
Propane	1	0.1	3.83
Butanol	1	0.1	4.33
Compressed Natural Gas (CNG)	0.9	0.1	1027 (BTU/scf)

Source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Vol.2 Table 2.2 (http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf)

5b: CH₄ Calculations – Example

Fuel Type	Adjusted Fuel Use (gal)	Emission Factor (kg CH ₄ /TJ)	Heat Content (mmBTU / bbl)	CH ₄ Emissions (MT CH ₄)	CH ₄ Emissions (MT CO ₂ e)
Gasoline	120,000	3	5.23	0.05	1.0
Diesel	444,000	3	5.83	0.19	4.1
Biodiesel	36,000	3	5.36	0.01	0.3
Total	NA	NA	NA	0.26	5.4

- CH₄ Emissions = Adjusted Fuel Use x Emission Factor x Heat Content x 2.51x10⁻⁸
- For CNG: CH₄ Emissions = Adjusted Fuel Use x Emission Factor x Heat Content x 1.05x10⁻¹²
- CO₂e Emissions = CH₄ Emissions x GWP
- GWP for CH₄ = 21



5c: N₂O Calculations – Example

Fuel Type	Adjusted Fuel Use (gal)	Emission Factor (kg N ₂ O/TJ)	Heat Content (mmBTU / bbl)	N ₂ O Emissions (MT N ₂ O)	N ₂ O Emissions (MT CO ₂ e)
Gasoline	120,000	0.6	5.23	0.01	2.9
Diesel	444,000	0.6	5.83	0.04	12.1
Biodiesel	36,000	0.6	5.36	0.00	0.9
Total	NA	NA	NA	0.05	15.9

- N₂O Emissions = Adjusted Fuel Use x Emission Factor x Heat Content x 2.51x10⁻⁸
- For CNG: N₂O Emissions = Adjusted Fuel Use x Emission Factor x Heat Content x 1.05x10⁻¹²
- CO₂e Emissions = N₂O Emissions x GWP
- GWP for N₂O = 310

5d: HFC Calculations

- “Tier D” – TCR GRP Screening Method
 - TCR considers simplified estimation method, but Ecology will accept it as a tiered method
 - TCR GRP Chapter 16, pg 128–131
- Most fleets will focus on unit use portion of equation
 - New equipment – only if new AC unit is not pre-charged with refrigerant
 - Equipment being disposed of – only if AC unit is being scrapped, not if vehicle / unit sold or leased



5d: HFC Calculations

Equation 16e

Estimating Emissions of Each Type of Refrigerant using the Screening Method

For each type of refrigerant:

$$\text{Total Annual Emissions (metric tons)} = \left[\frac{(C_N \times k) + (C \times x \times T) + (C_D \times y \times (1 - z))}{1,000} \right]$$

(kg)
(%)
(kg)
(%)
(years)
(kg)
(%)
(%)
(kg/metric ton)

Where:

C_N = quantity of refrigerant charged into the new equipment ¹

C = total full charge (capacity) of the equipment

T = time in years equipment was in use (e.g., 0.5 if used only during half the year and then disposed)

C_D = total full charge (capacity) of equipment being disposed of ²

k = installation emission factor ¹

x = operating emission factor

y = refrigerant remaining at disposal ²

z = recovery efficiency ²

¹ Omitted if no equipment was installed during the reporting year or the installed equipment was pre-charged by the manufacturer

² Omitted if no equipment was disposed of during the reporting year

Type of Equipment	Capacity (kg)	Installation Emission Factor k (% of capacity)	Operating Emission Factor x (% of capacity / year)	Refrigerant Remaining at Disposal y (% of capacity)	Recovery Efficiency z (% of remaining)
Mobile Air Conditioning	0.5 – 1.5	0.5 %	20 %	50 %	50 %



5d: HFC Calculations –Example

- $1.5 \text{ kg refrigerant capacity} \times 20\% \text{ operating emission factor} \times 1 \text{ year time in fleet} / 1,000$
 $= 0.0003 \text{ MT HFCs} / \text{AC unit}$
- Most vehicle AC systems = HFC-134a, GWP = 1,300
- $0.0003 \text{ MT HFCs} / \text{AC unit} \times 1,300 \text{ GWP}$
 $= 0.39 \text{ MT CO}_2\text{e} / \text{AC Unit}$
- Decommissioned unit = $0.38 \text{ MT CO}_2\text{e} / \text{AC Unit}$
- Company X has 433 vehicles with AC units + 30 decommissioned units (77% in state) = $142 \text{ MT CO}_2\text{e}$

5e: Other Emissions Calculations

- Auxiliary units
 - Refrigeration systems
 - Generators - APUs
 - TCR GRP methods – Chapters 16 or 12
 - Calculate and add to total direct emissions
- Many fleets will not have these emission types



5e: Other Emissions Calculations – Example

- $8 \text{ kg refrigerant capacity} \times 50\% \text{ operating emission factor} \times 1 \text{ year time in fleet} / 1,000$
 $= 0.004 \text{ MT HFCs} / \text{reefer trailer}$
- Most reefer trailers = HFC-134a, GWP = 1,300
- $0.004 \text{ MT HFCs} / \text{trailer} \times 1,300 \text{ GWP}$
 $= 5.2 \text{ MT CO}_2\text{e} / \text{trailer}$
- Decommissioned unit = $0.94 \text{ MT CO}_2\text{e} / \text{trailer}$
- Company X has 15 reefer trailers + 2 decommissioned units (60% in state) = $21 \text{ MT CO}_2\text{e}$



5f: Convert to CO₂e

Must use GWP factors to convert emissions to
CO₂e

- CO₂ = 1
- CH₄ = 21
- N₂O = 310
- HFCs typically = HFC 134a = 1,300

5: Total Direct Emissions

	Fossil Fuel MT CO ₂ e	Biomass MT CO ₂ e	Total MT CO ₂ e
CO ₂	5,564	341	5,904
CH ₄	5.4	NA	5.4
N ₂ O	15.9	NA	15.9
HFCs	162	NA	162
Total	5,748	341	6,088



5: Emissions Calculator

Washington State Department of Ecology Greenhouse Gas On-Road Motor Vehicles Emissions Calculator

Fuel Use

	Fuel Used	Biomass Content	% in Washington
Gasoline:	<input type="text"/> gallons	0%	100%
Diesel:	<input type="text"/> gallons	0%	100%
Biodiesel:	<input type="text"/> gallons	5%	100%
Ethanol:	<input type="text"/> gallons	10%	100%
Liquefied Petroleum Gas (LPG):	<input type="text"/> gallons	0%	100%
Propane:	<input type="text"/> gallons	0%	100%
Butanol:	<input type="text"/> gallons	0%	100%
Compressed Natural Gas (CNG):	<input type="text"/> scf	0%	100%

Air Conditioning:

	AC Units	% in Washington
Vehicles in Fleet with AC Units:	<input type="text"/>	100%
Number of AC Units Decommissioned:	<input type="text" value="0"/>	

Reefer Trailers:

	Reefer Units	% in Washington
Reefer Trailers in Fleet:	<input type="text"/>	100%
Number of Reefer Trailers Decommissioned:	<input type="text"/>	

calculate



6: Interpret Results

- Determine if over threshold
- If 2,500 MT CO₂e threshold exceeded, report emissions
- Check for and correct errors



7: Self Certification

- Designated representative must certify report
 - Report all Washington emissions for vehicles within your organizational boundaries
 - Verify all methods, data, and calculations are accurate

- Draft Rule Section WAC 173-441-140 and 150



8: Submit Report

- Report to Ecology
 - No separate reporting to Local Air Authorities
- Plan to use TCR platform for data management
 - Online submittal
 - Will include calculation features
- Emissions must be reported annually
 - Calendar year - January 1st to December 31st
- Reports must be self-certified and submitted by
 - October 31st of the following year
 - 2009 emissions must be reported by October 31st, 2010

8: Report Web-form

CRIS: Climate Registry Information System - Windows Internet Explorer

http://64.106.211.231/eats/tcr_test/index.cfm?hc=I1LOOCAK

CRIS: Climate Registry Information System

Fuel Consumed * Gasoline (Motor Gasoline) ▾

Quantity * 1000 gallons ▾

Oxidation Factor 1

Calculate

CO2 (Carbon dioxide) **CH4 (Methane)** **N2O (Nitrous Oxide)**

Greenhouse Gas CO2 (Carbon dioxide)

Default Formula $[Quantity] * [Emission Factor] * [Oxidation Factor] / 1000$

Do you wish to customize these values?

CH4 (Methane)

CO2 (Carbon dioxide)

N2O (Nitrous Oxide)

Back **Save Draft Emissions**



Fleet of Marine Vessels Reporting Steps

1. Determine organizational boundaries
2. Limit to in-state emissions
3. Collect data
4. Separate biomass emissions
5. Calculate emissions (direct and indirect)
6. Interpret results
7. Self certification
8. Submit report

Example using Company X emissions



1: Organizational Boundaries – Example

- Company X owns and operates fleet of 10 container ships making a total of 95 round trip transits per year from China to Seattle
- Container movement in US by independent companies



2: Limiting to In-State Emissions

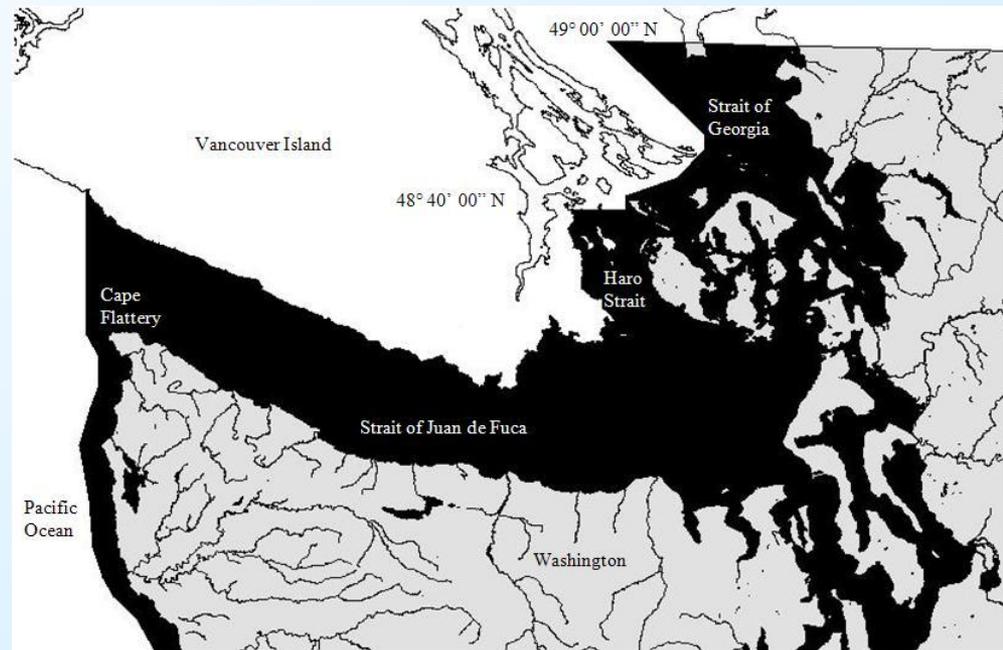
Different methods for each source type (WAC 173-441-080)

- Aircraft:
 - By flight: if both takeoff and landing in Washington
- Marine vessels:
 - Instate only (report 100%)
 - Puget Sound system
 - Columbia and Snake River systems
 - Other
- Rail equipment:
 - Instate only (report 100%)
 - Percentage of gross ton-miles
 - Hours of operation

2: Limiting to In-State Emissions

Puget Sound method:

- Only if point of arrival or last departure in WA
- All emissions between entry and exit lines:
 - Strait of Juan de Fuca: 3 nautical miles west of Cape Flattery
 - Haro Strait: 48° 40' 00" N
 - Strait of Georgia: 49° 00' 00" N





2: Limiting to In-State Emissions – Example

- Fleet of 10 container ships making a total of 95 round trip transits per year from China to Seattle
- 2% of fuel consumption in Puget Sound



Calculating Emissions

- Basic and most common method covered here:
 - CO₂: Tier B – fuel use and default emission factors
 - CH₄ and N₂O: Tier A – fuel use and default emission factors
 - HFCs: TCR screening method
- Methods available for organizations that only track mileage and fuel efficiency
- Report submission form will include calculations



Tiers

CO₂ Emissions

Tier	Data	Factor
A1	Fuel use	<ul style="list-style-type: none"> ● Measured carbon content and fuel density or ● Measured carbon content and heat content
A2	Fuel use	<ul style="list-style-type: none"> ● Measured heat content and default carbon content or ● Measured carbon content and default heat content
B	Fuel use	Default factors by fuel type
C	Fuel use estimated by mileage	Default factors by fuel type

CH₄ & N₂O Emissions

Tier	Data	Factor
A	Fuel use	Default factors based on vehicle type and fuel type
B	Fuel use estimated by mileage	Default factors based on vehicle type and fuel type

HFC Emissions

Tier	Data
A	Mass balance
B	Simplified mass balance
“D”	Screening method

3: Collecting Data

- Will need:
 - Total amount of fuel used in Washington
 - Fuel values must be reported separately by fuel type: gasoline, diesel, bunker fuel, etc
- If necessary:
 - Fuel use and/or refrigerant information for any auxiliary power units (APUs), cooling systems, or other devices
 - Electricity consumption



3: Collect Data – Example

Fuel Type	Gallons Used	% in Washington	Adjusted Fuel Use (gallons)
Residual Fuel Oil (No. 6)	100,000,000	2%	2,000,000



5a: CO₂ Calculations

- CO₂: Tier B – fuel use and default emission factors
- From TCR GRP Chapter 13: Direct Emissions from Mobile Combustion
- Other methods require more data including:
 - Measured fuel characteristics (carbon and/or heat content)
 - Mileage and fuel economy of each vehicle

5a: CO₂ Calculations – Example

Fuel Type	Adjusted Fuel Use (gal)	Emission Factor (kg CO ₂ / gal)	CO ₂ Emissions (MT CO ₂)	CO ₂ Emissions (MT CO ₂ e)
Residual Fuel Oil (No. 6)	2,000,000	11.80	23,600	23,600

- Adjusted Fuel Use x Emission Factor / 1,000 = CO₂ Emissions
- CO₂ Emissions x GWP = CO₂e Emissions
- GWP for CO₂ = 1



5b & c: CH₄ and N₂O Calculations

- CH₄ and N₂O: Tier A – fuel use and default emission factors
- From TCR GRP Chapter 13: Direct Emissions from Mobile Combustion
- Other methods require more data including:
 - Mileage and fuel economy of each vehicle

5b: CH₄ Calculations – Example

Fuel Type	Adjusted Fuel Use (gal)	Emission Factor (g CH ₄ / gal)	CH ₄ Emissions (MT CO ₂)	CH ₄ Emissions (MT CO ₂ e)
Residual Fuel Oil (No. 6)	2,000,000	0.86	1.7	36

- Adjusted Fuel Use x Emission Factor / 1,000,000 = CH₄ Emissions
- CH₄ Emissions x GWP = CO₂e Emissions
- GWP for CH₄ = 21

5c: N₂O Calculations – Example

Fuel Type	Adjusted Fuel Use (gal)	Emission Factor (g N ₂ O / gal)	N ₂ O Emissions (MT CO ₂)	N ₂ O Emissions (MT CO ₂ e)
Residual Fuel Oil (No. 6)	2,000,000	0.30	0.6	186

- Adjusted Fuel Use x Emission Factor / 1,000,000 = N₂O Emissions
- N₂O Emissions x GWP = CO₂e Emissions
- GWP for N₂O = 310

5d: HFC Calculations

- From refrigeration and air conditioning units
- Simplified Estimation Method: TCR GRP Screening Method
 - TCR GRP Chapter 16, pg 128–131
- Most fleets will focus on unit use portion of equation
 - New equipment – only if new unit is not pre-charged with refrigerant
 - Equipment being disposed of – only if unit is being scrapped, not if vehicle / unit sold or leased
- Example: similar to on-road fleets, see on-road presentation for details

5e: Other Emissions Calculations

- Auxiliary units
 - Other fugitive sources
 - Generators (APUs) not already accounted for
 - TCR GRP methods – Chapters 16 or 12
 - Calculate and add to total direct emissions

5f: Convert to CO₂e

Must use GWP factors to convert emissions to
CO₂e

- CO₂ = 1
- CH₄ = 21
- N₂O = 310
- HFCs typically:
 - HFC 134a = 1,300, or
 - R-410a = 1,725



5: Total Direct Emissions

	Fossil Fuel MT CO ₂ e	Biomass MT CO ₂ e	Total MT CO ₂ e
CO ₂	23,600	0	23,600
CH ₄	36	NA	36
N ₂ O	186	NA	186
Total	23,822	0	23,822



5g: Indirect Emissions Calculations

- Once threshold exceeded, then include indirect emissions
 - Mostly electricity for fleets
 - Keep separate from direct emissions
- Tier B – electricity use and eGRID power pool specific emission factors
 - Updated factors : <http://cfpub.epa.gov/eGRIDweb/index.cfm>
- From TCR GRP Chapter 14: Indirect Emissions from Electricity Use
- Other methods for utility specific emissions factors



5g: Indirect Emissions Calculations

– Example

Shore Power (MWh)	CO ₂ Emissions Factor (lbs/MWh)	CH ₄ Emissions Factor (lbs/MWh)	N ₂ O Emissions Factor (lbs/MWh)	Total Indirect Emissions (MT CO ₂ e)
4,750	902.24	0.01913	0.01490	1,955

eGRID NWPP emissions factors: 2005

- $\text{MWh} \times \text{eGRID NWPP Emission Factor} \times 0.45359237 \times \text{GWP} / 1,000 = \text{CO}_2\text{e Emissions}$



6-8: Interpret Results, Self Certify, and Report

- Determine if over threshold
- Report if direct emissions $\geq 10,000$ MT CO₂e threshold ($\geq 25,000$ MT CO₂e for 2009)
 - After threshold triggered, include indirect emissions
- Check for and correct errors
- Emissions must be reported annually
 - Calendar year - January 1st to December 31st
- Reports must be self-certified and submitted electronically to Ecology by
 - October 31st of the following year
 - 2009 emissions must be reported by October 31st, 2010



Questions?