



IOWA DEPARTMENT OF NATURAL RESOURCES

LEADING IOWANS IN CARING FOR OUR NATURAL RESOURCES

Calculating and Reporting Greenhouse Gas Emissions

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Reasons to calculate greenhouse gas (GHG) emissions

1. Iowa DNR Construction Permit and Title V Applications

- Greenhouse Gas Emissions Estimation Guidance
- Stationary Fossil Fuel Combustion Calculation Tool
 - Updated emission factors and high heating values.

2. EPA Federal Reporting

3. Carbon Footprint

4. Voluntary Reporting Programs e.g. The Climate Registry



What pollutants should I include?

The definition of *subject to regulation* in Iowa Administrative Code [567 IAC 22.100 and 33.3(1)] defines *greenhouse gases* as the aggregate group of six greenhouse gases:

1. carbon dioxide (CO₂)
2. nitrous oxide (N₂O)
3. methane (CH₄)
4. hydroflurocarbons (HFCs)
5. perfluorocarbons (PFCs)
6. sulfur hexafluoride (SF₆)

Greenhouse gases (GHGs) are also defined in 567 IAC 20.2.

What are global warming potentials (GWPs)?

- The potency of greenhouse gases can vary and are indicated by the pollutants' GWP.
- Greenhouse gas emissions are typically converted to a unit of measure called carbon dioxide equivalents (CO₂e) that allows for better comparison of the impact of different greenhouse gases.

$$\text{tons CO}_2\text{e} = \sum_{i=0}^n \text{GHG}_i \times \text{GWP}_i$$

Where:

GHG_i = Mass emissions of each greenhouse gas

GWP_i = Global warming potential for each greenhouse gas

n = the number of greenhouse gases emitted

Calculating CO₂e

Example:

Calculate the greenhouse gas emissions in units of carbon dioxide equivalent (CO₂e) from a generator that has the potential to emit 8,158.46 tons CO₂, 0.33 tons CH₄, and 0.06 tons N₂O per year.

$$\text{tons } CO_2e = (8,158.46 \times 1) + (0.33 \times 21) + (0.06 \times 310) = 8,183.99$$

Which GWPs should I use?



- EPA finalized a rulemaking on 11/23/13 to update the global warming potentials used in federal mandatory GHG reporting.
- Rule was effective 01/01/14 for **federal** reporting.

GWPs in Table A-1 of 40 CFR 98 Subpart A

GHG	“old” 10/30/09 Federal Register	“new” 11/23/13 Federal Register
CH ₄	21	25
N ₂ O	310	298
SF ₆	23,600	22,800
HFCs	See rule.	
PFCs	See rule.	

Which GWPs should I use?

- Use the “new” GWPs for federal programs.
- Use the “old” GWPs for Iowa DNR forms until the DNR rules are updated.
 - Definition of *subject to regulation* in 567 IAC 22.100 and 33.3(1) requires use of the “old” GWPs as of 10/30/09 to calculate GHG emissions.
 - EPA and DNR do not expect existing construction permits using the old GWPs to be reopened.
 - Any facility whose PTE changes to >100,000 tons CO₂e based on the new GWPs will have one year from the date the new GWPs are adopted into the Iowa Administrative Code to apply for Title V.



DNR Calculation Tools



- [Greenhouse Gas Estimation Guidance](#)

Recommends same emissions hierarchy as for other pollutants

1. Continuous emission monitor (CEM) data.
2. Stack test
3. Material balance or mass balance
4. Emission factors Vendor supplied factors
5. Engineering estimation

- [Stationary Fossil Fuel Combustion Calculation Tool](#)

- You may modify the spreadsheet to fit your needs, such as listing individual units.
- Tool was updated on 01/31/14 to include updated emission factors and high-heating values. Make sure you are using the most current version.
- Questions for audience:
 - Are there any ways the spreadsheet tool can be improved?
 - Would you prefer to have gases maximum rated capacity in MMBtu instead of standard cubic feet?

Iowa DNR Construction Permit Applications

Since July 2007, all construction permit applications must include potential GHG emissions per Iowa Code 455B.

Form GHG – Facility and Project Greenhouse Gas Emission Inventory

- Calculate potential or permitted emission rate for each of the 6 GHGs and CO₂e in tons per year.
 - List all units in the project including exempt units and other non-permitted emission units.
 - Mobile sources are not required to be listed.
 - Include stack emissions, fugitive emissions, total project emissions, and total plant emissions.
 - Include calculations.
- If the GHG emissions are zero, please indicate that so we don't think you forgot to calculate them.
- If you have questions, please call the helpline at 1-877-AIR-IOWA.

DNR Title V and Minor Source Emission Inventories

- GHG actual emissions are **not** required to be reported to DNR.
 - Reporting was required for Title V and ethanol plants from 2007 - 2009.
- Larger sources (usually with actual emissions $\geq 25,000$ mtCO₂e) may be subject to federal GHG reporting.
- If your potential GHG emissions ≥ 100 tons GHG per year on a mass basis and 100,000 tons per year CO₂e, your facility is subject to the Title V Operating Permit program.

Iowa DNR Title V Operating Permit Applications

Since the Tailoring Rule was adopted by the Iowa DNR in December 2010, all Title V applications must include GHG potential emissions.

Form 1.5 Potential Emissions – Significant Activities

- Report plant-wide GHG potential emissions in both:
 - Mass basis (*tons of each of the 6 GHG pollutants*) and CO₂e basis (*total tons of CO₂e*)
- Use 8,760 hours of operation annually unless there is a federally enforceable limit restricting the equipment's operation.

Part 2

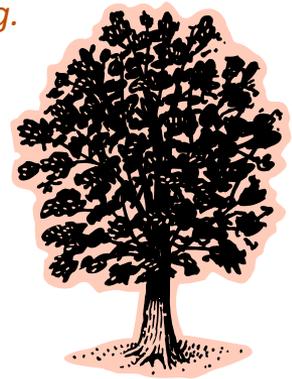
- List any GHG emission limits from construction permits in Section II if you use the old Part 2 forms, or the Emission Point Information form if you use the new Part 2 forms.

What about biogenic emissions?

- On July 20, 2011 EPA deferred biogenic emissions of CO₂ from counting towards Title V and PSD **permitting** for three years.
 - *Reporting of biogenic emissions is required for some categories in federal GHG reporting.*

- The deferral is for biogenic CO₂ emissions only. Sources include:

Combustion of biological material	Fermentation
Combustion of municipal solid waste	Anaerobic digestion of waste
Sources/users of biogas	



- On July 12, 2013 the D.C. Court of Appeals vacated the biogenic deferral, but the Court never issued the mandate.
 - The Court could issue the mandate after the U.S. Supreme Court rules on *Utility Air Group v. EPA* in June 2014.
 - EPA could do a rulemaking to make the deferral permanent.
 - EPA could allow the deferral to expire on July 21, 2014.

Should I include biogenic emissions in my DNR air permit application?

- Until the mandate is issued or the deferral expires, biogenic CO₂ emissions do not count towards the Title V and PSD Greenhouse Gas permitting thresholds.
- EPA and DNR do not expect to reopen existing permits when/if the deferral goes away.
- Sources that become newly subject to Title V because of the inclusion of biogenic emissions will have one year from the date the deferral ends to submit a Title V application to DNR.

Mandatory GHG Reporting to EPA – 40 CFR Part 98

- Federal GHG reporting program effective December 29, 2009.
- Reports are filed annually by March 31 using EPA’s electronic reporting tool.
DNR does not have delegation of the program or access to the tool (called e-GRRT).
- Requires annual reporting of GHGs by:
 - 36 source categories
 - 6 types of suppliers of fuels and industrial GHGs
 - 3 source categories have not been implemented yet - food processors, ethanol production, and manure management
- There have been over 60 rulemaking changes since original rule. Always refer to the electronic CFR for the most current requirements.
<http://www.ecfr.gov/cgi-bin/ECFR?page=browse>
- Training, fact sheets, e-GRRT, etc. available at
<http://www.epa.gov/ghgreporting/index.html>



Source categories subject to federal reporting

Part 98 Subpart	Source Category	# of Iowa Sources that Reported in 2011	First Year of Emissions Reported
C	General Stationary Fuel Combustion Sources	142	2010
D	Electricity Generation	25	2010
G	Ammonia Manufacturing	3	2010
H	Cement Production	2	2010
N	Glass Production	1	2010
Q	Iron and Steel Production	2	2010
S	Lime Manufacturing	1	2010
V	Nitric Acid Production	2	2010
W	Petroleum and Natural Gas Systems	10	2011

This list does not include 27 source categories for which there is not a source currently located in Iowa.

Source categories subject to federal reporting

Part 98 Subpart	Source Category	# of Iowa Sources that Reported in 2011	First Year of Emissions Reported
DD	Use of Electric Transmission and Distribution Equipment	2	2011
HH	Municipal Solid Waste Landfills	20	2010
II	Industrial Wastewater Treatment	23	2011
NN	Suppliers of Natural Gas and Natural Gas Liquids	11	2010
PP	Suppliers of Carbon Dioxide	5	2011
TT	Industrial Waste Landfills	1	2011

This list does not include 27 source categories for which there is not a source currently located in Iowa.

When can you stop reporting to federal GHG program?

- If annual reports demonstrate GHG emissions <25,000 metric tons CO₂e per year for 5 consecutive years
- If annual reports demonstrate GHG emissions <15,000 metric tons CO₂e per year for 3 consecutive years.
- If you shut down all processes/units/supply operations covered by the rule.
- You must notify EPA if you no longer are required to report.
- If threshold is subsequently triggered, must start reporting again.

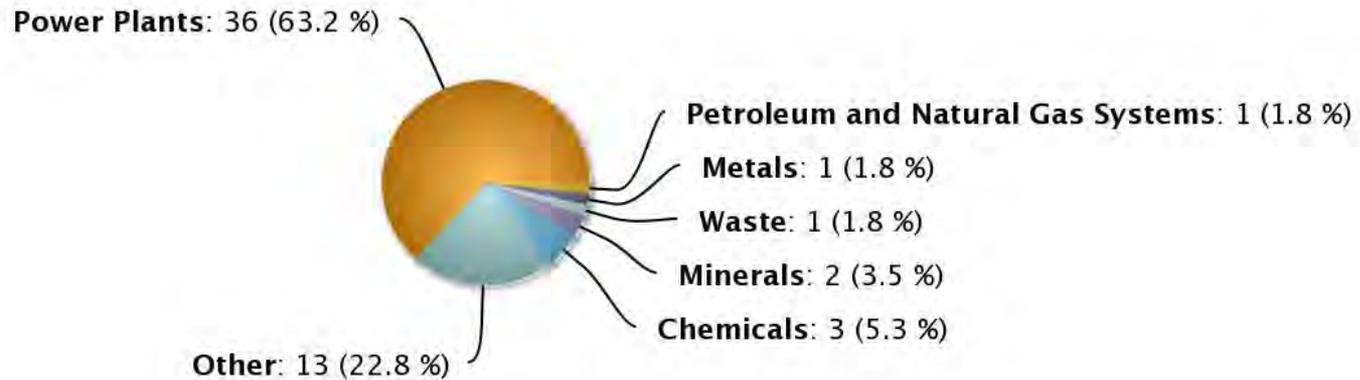


Where can I find GHG data that was submitted to EPA?

The screenshot shows the EPA Facility Level GHG Emissions website. The main content is a map of the United States with circular markers indicating GHG emissions by state. A summary table at the bottom provides the following data:

Sector	Power Plants	Petroleum and Natural Gas Systems	Refineries	Chemicals	Other	Waste	Metals	Minerals	Pulp and Paper
2012 GHG Emissions (Million Metric Tons CO ₂ e)	2,090	217	173	170	123	100	107	107	42
# of Reporting Facilities	1,611	2,058	144	463	1,419	1,611	297	369	232

Iowa 2012 direct GHG emissions reported to EPA



Source: EPA Flight - <http://ghgdata.epa.gov/ghgp/main.do>

Carbon Footprints and Voluntary Reporting Programs

- Means to track/manage GHG emissions.
 - *You can't manage what you don't measure.*
- Helps prepare for state, regional and/or federal reporting.
- Identifies energy efficiency and waste reduction opportunities.
- Good public relations with customers for doing voluntary inventory.

CO₂

SF₆

CH₄

N₂O

HFCs

PFCs

SCOPE 1
DIRECT

SCOPE 2
INDIRECT

SCOPE 3
INDIRECT

PURCHASED ELECTRICITY
FOR OWN USE

COMPANY
OWNED VEHICLES

EMPLOYEE BUSINESS TRAVEL

PRODUCTION OF
PURCHASED
MATERIALS

WASTE DISPOSAL

PRODUCT
USE

OUTSOURCED ACTIVITIES

CONTRACTOR OWNED
VEHICLES

FUEL COMBUSTION



Join The Climate Registry

The Climate Registry

- Currently over 300 members
- Five levels of membership
- Document early actions to reduce GHG emissions
- Recognition as a global environmental leader
- Full carbon footprint

Membership Level	Features
Basic Membership	Use TCR tools to build a GHG inventory.
Climate Registered	Report, verify, and publically disclose annual GHG emissions inventory.
Climate Registered Silver	1)Create a GHG reduction plan 2)Demonstrate best practices based on TCR checklist
Climate Registered Gold	Reduce Scope 1 & 2 emissions by 5%
Climate Registered Platinum	Reduce Scope 1 & 2 emissions by 20%

Questions and Thank you!



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<http://www.iowadnr.gov/InsideDNR/RegulatoryAir/GreenhouseGasEmissions.aspx>

<http://www.epa.gov/ghgreporting/index.html>

<http://www.theclimateregistry.org/>

<http://www.epa.gov/climatechange/>