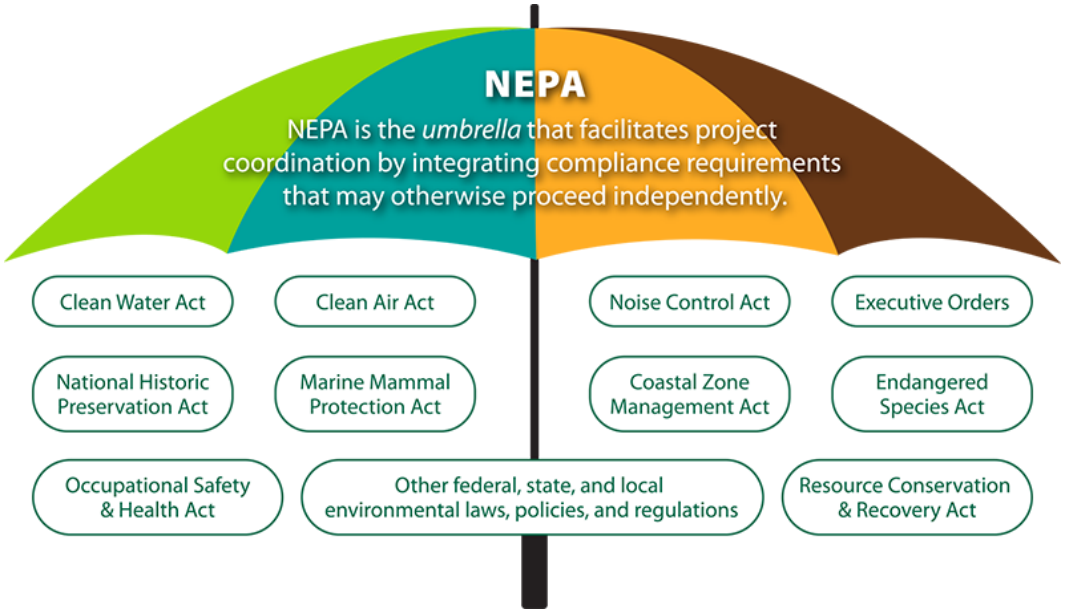
Stantec

Capturing Climate Adaptation and Resilience with Minnesota Environmental Review: Approach to Analysis and Expectations for Future Requirements

Environmental Review Overview

Federal Environmental Review



- National Environmental Policy Act (NEPA)
- Required if federal nexus – federal funding or action
- Types of environmental review:
  - Categorical Exclusion (CATEX/CE)
  - Environmental Assessment (EA)
  - Environmental Impact Statement (EIS)

State Environmental Review

- Minnesota Environmental Policy Act (MEPA)
- Regulatory Governmental Unit (RGU) for each type of State review
- **Mandatory review**: project exceeds EAW/EIS mandatory thresholds per Minn. Stat. 4410.4300 and .4400
- **Discretionary review**: RGU determines project may have the potential for significant environmental effects
- Types of environmental review:
  - Environmental Assessment Worksheet (EAW)
  - Environmental Impact Statement (EIS)
  - Alternative Urban Areawide Review (AUAR)
- Mandatory EAW/EIS categories:
  - Residential
  - Industrial, Commercial, Institutional
  - Solid Waste Facilities
  - Air Pollution

EAW/EIS - Additional Considerations

3-year look-back rule

4410.4300, Subpart 1 – Construction that has occurred within previous 3 years and has not been reviewed is included in the cumulative total

Phased actions

2 or more projects by the same proposer – same geographic area and undertaken sequentially

Connected actions

Projects that directly induce the other; one is a prerequisite for the other, or neither project justified by itself

Climate & Greenhouse Gas (GHG) Overview

Climate & GHG Items

- 2022 Voluntary Climate Change Pilot Program
- Dec. 2022 new form adopted
- EAW Items:
  - Item 7 – Climate adaptation & resilience
  - Item 18 – GHG Emissions
- Climate considerations incorporated into other EAW Items
  - Rare species
  - Stormwater
  - Water appropriation
  - Contamination/ hazardous materials
- July 2023 EAW Guidance

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Environmental assessment worksheet (EAW) guidance

ping a carbon footprint and incorporating climate adaptation and resilience

July 2023

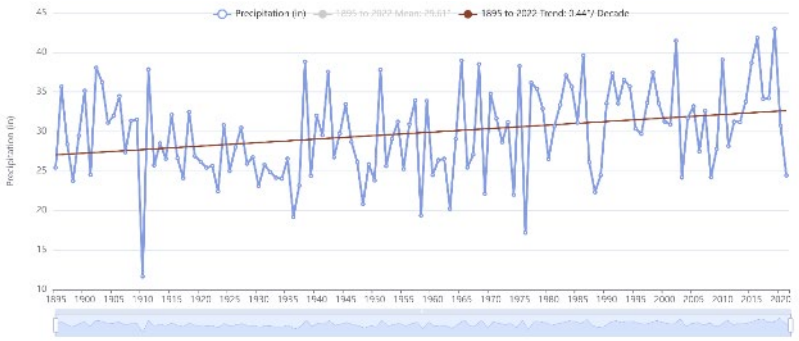
Climate Trends

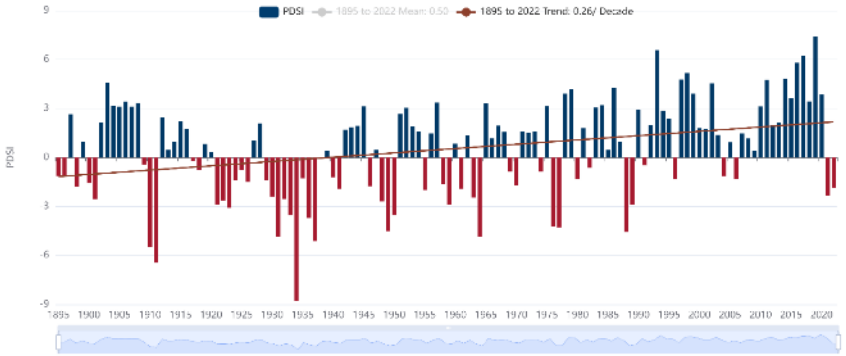
Primary trends:

- Warmer and wetter
- Cold weather warming
- More damaging rains
- Increasing risk of heat waves
- Increasing risk of drought

Resources:

- DNR Climate Explorer – precipitation, temperature, drought (PDSI)
- EPA CREAT – Storm intensity projections
- NOAA Climate at a glance – Detailed climate data





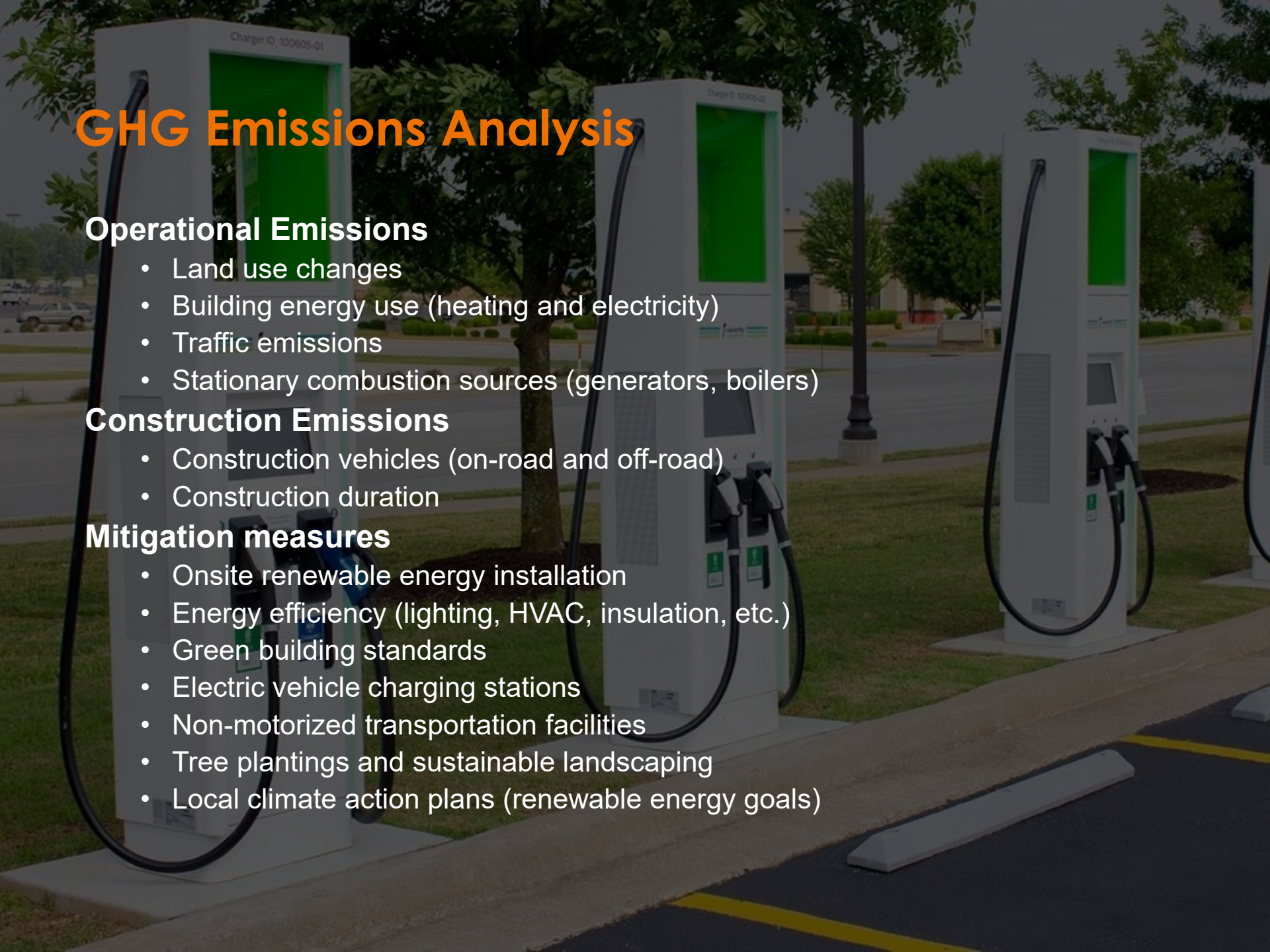
Climate Trends – Part B

Project's interactions with climate trends:

- Land conversion
- Impervious surface changes
- Building materials
- Site design

Adaptation strategies:

- Proposed or potential measures
- Should accurately describe the project
- Examples: green infrastructure, tree plantings, building design



GHG Emissions Analysis

Operational Emissions

- Land use changes
- Building energy use (heating and electricity)
- Traffic emissions
- Stationary combustion sources (generators, boilers)

Construction Emissions

- Construction vehicles (on-road and off-road)
- Construction duration

Mitigation measures

- Onsite renewable energy installation
- Energy efficiency (lighting, HVAC, insulation, etc.)
- Green building standards
- Electric vehicle charging stations
- Non-motorized transportation facilities
- Tree plantings and sustainable landscaping
- Local climate action plans (renewable energy goals)

GHG Emissions Analysis Tools

EPA Simplified Greenhouse Gas Calculator (SGEC) Tool and Emission Factors Hub

Inputs:

Construction

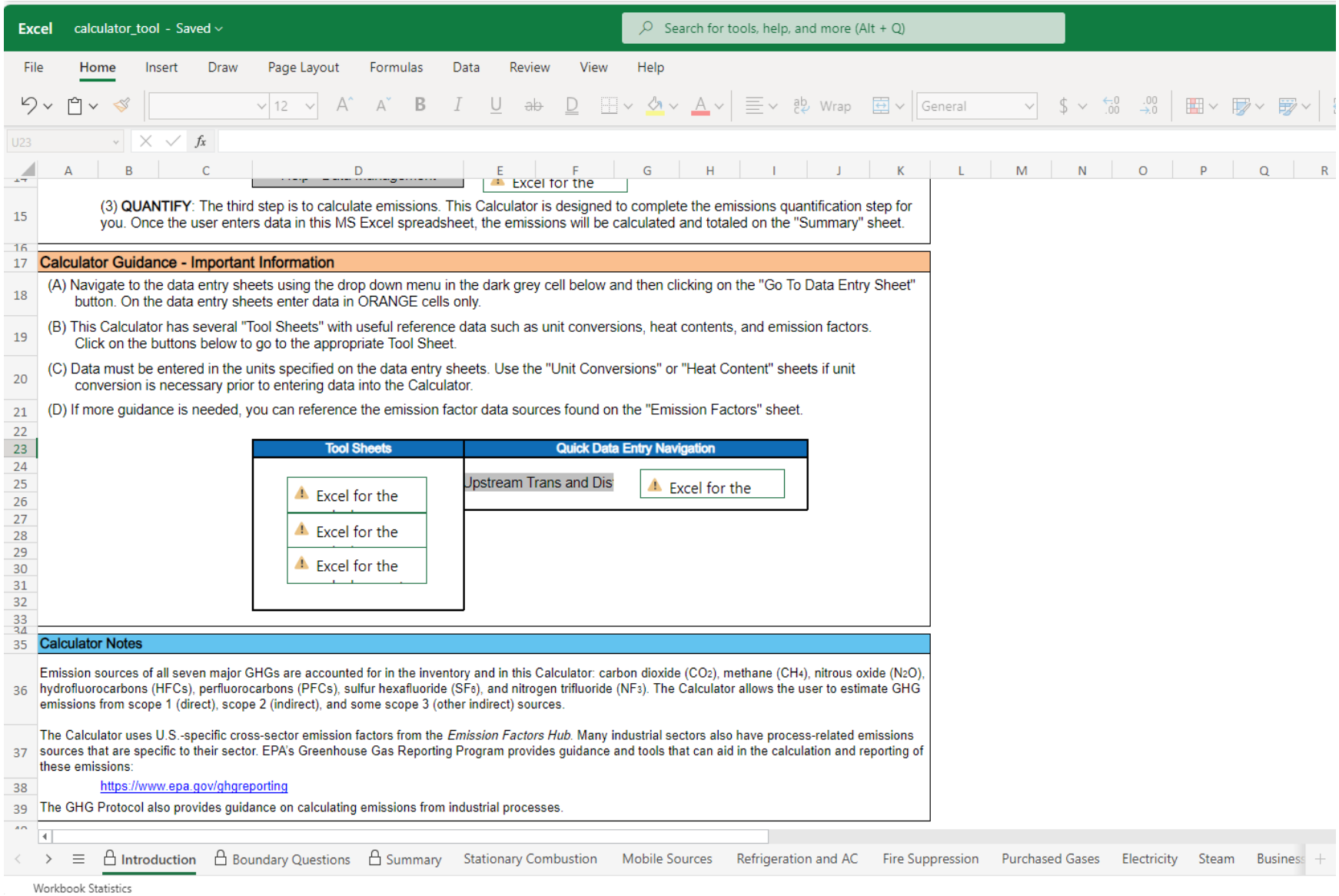
- Vehicle type and quantity (on-road and off-road)
- Workers' commute distances
- Construction schedule and duration (years, days/year, hours/day)

Operation

- Stationary combustion - natural gas usage (if unknown, lookup natural gas intensity for building type)
- Purchased electricity (if unknown, estimate using lookup electricity intensity for building type)
- Mobile sources (traffic study or estimate for residents, workers, deliveries)

Minnesota Infrastructure Carbon Estimator (MICE)

SGEC


Excel
calculator_tool - Saved
Search for tools, help, and more (Alt + Q)
File
Home
Insert
Draw
Page Layout
Formulas
Data
Review
View
Help
Wrap
General
U23
Excel for the
(3) QUANTIFY: The third step is to calculate emissions. This Calculator is designed to complete the emissions quantification step for you. Once the user enters data in this MS Excel spreadsheet, the emissions will be calculated and totaled on the "Summary" sheet.
Calculator Guidance - Important Information
(A) Navigate to the data entry sheets using the drop down menu in the dark grey cell below and then clicking on the "Go To Data Entry Sheet" button. On the data entry sheets enter data in ORANGE cells only.
(B) This Calculator has several "Tool Sheets" with useful reference data such as unit conversions, heat contents, and emission factors. Click on the buttons below to go to the appropriate Tool Sheet.
(C) Data must be entered in the units specified on the data entry sheets. Use the "Unit Conversions" or "Heat Content" sheets if unit conversion is necessary prior to entering data into the Calculator.
(D) If more guidance is needed, you can reference the emission factor data sources found on the "Emission Factors" sheet.
Tool Sheets
Excel for the
Excel for the
Excel for the
Quick Data Entry Navigation
Upstream Trans and Dis
Excel for the
Calculator Notes
Emission sources of all seven major GHGs are accounted for in the inventory and in this Calculator: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6), and nitrogen trifluoride (NF3). The Calculator allows the user to estimate GHG emissions from scope 1 (direct), scope 2 (indirect), and some scope 3 (other indirect) sources.
The Calculator uses U.S.-specific cross-sector emission factors from the Emission Factors Hub. Many industrial sectors also have process-related emissions sources that are specific to their sector. EPA's Greenhouse Gas Reporting Program provides guidance and tools that can aid in the calculation and reporting of these emissions:
https://www.epa.gov/ghgreporting
The GHG Protocol also provides guidance on calculating emissions from industrial processes.
Introduction
Boundary Questions
Summary
Stationary Combustion
Mobile Sources
Refrigeration and AC
Fire Suppression
Purchased Gases
Electricity
Steam
Business
Workbook Statistics

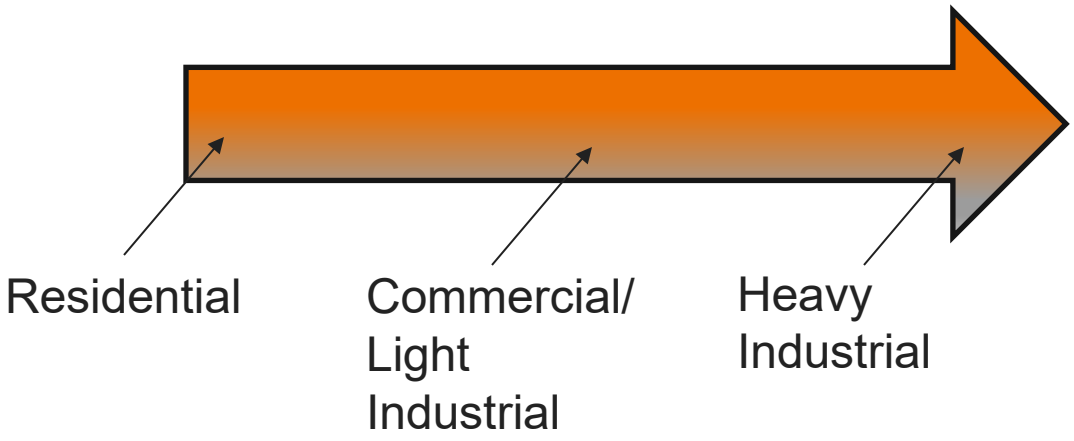
GHG Calc Appendices Excerpt

GHG Emissions Summary

Scope	Source	CO_2 (ton/yr)	CH_4 (ton/yr)	N_2O (ton/yr)	CO_2e (ton/yr)
Direct Emissions					
Scope 1	Construction - Mobile Sources Onroad - Gasoline and Diesel (averaged over 50 years)	28	0.0002	0.001	28
Scope 1	Construction - Mobile Sources Non-road - Diesel (averaged over 50 years)	104	0.010	0.10	135
Scope 1	Construction - 140th Street Improvements				7
Scope 1	Operations - Stationary Combustion - Natural Gas	NA			
Scope 1	Operations - Mobile Sources - Gasoline and Diesel Vehicles	2,249	0.02	0.1	2,269
Scope 1	Operations - Mobile Sources - Diesel Rail	7.3	0.0006	0.0002	7.3
Scope 1	Operations - Refrigeration	-	-	-	229
Indirect Emissions					
Scope 2	Purchased Electricity	10,726	1.1	0.16	10,976
Scope 2	Waste - Operations	-	-	-	5,237
Atmospheric Removals of GHGs					
Scope 1 - Sinks	Land Use (CO2 Removals to Terrestrial Storage)				52
Total		**13,107**	**1.2**	**0.34**	**18,942**
				Lifetime	947,110

Project Types

- **GHG Analysis – Level of Complexity**



New EQB Climate Guidance

Updated EQB Climate Guidance August 1, 2023

- Carbon footprint definition revised to include upstream and downstream emissions
- Additional explanation of mitigation measures

Potential to increase complexity of GHG analysis

- Upstream emissions include those related to the production, acquisition, or transportation of goods or services required for the project.
- Downstream emissions include those related to the handling and disposal of any resultant products at the end of their life.
- Life-cycle analyses for building materials, manufacturing products (“cradle to grave”)

Climate & Greenhouse Gas (GHG) Details

Data Collection

- Type of data to collect
  - Climate: Project County, Green Infrastructure to Implement (if applicable)
  - GHG: Square Footage of Building(s) as applicable, Type of usage (residential, office, commercial, light industrial, heavy industrial, etc.)
- Who to reach out to for data
  - Project Proposer
    - Local Government (City etc.), if proposer
    - Developer, if proposer
  - Contractor
    - Wetland delineation
    - Traffic
    - Noise
    - Etc.

GHG Data Collection Gaps - Assumptions

- Common Data Gaps:
  - Unknown End User
  - Unknown Equipment List
  - Unknown Traffic Impact
- Common Data Gap Solutions:
  - Assume the project area utilizes the maximum build
    - For example: 100% light industrial in a mixed development
  - Estimate based on square footage
    - Explain that list is unknown in the EAW
  - Estimate based on similar projects

Climate Analysis – Considerations and Adaptations

- Increase in Precipitation and Frequency of Heavy Rainfall Events
  - Flooding Risk
    - Runoff
    - Hazardous Material Storage
  - Mitigation
    - Green Infrastructure (Rain Gardens, Catch Basins, Infiltration Systems)
- Increase in Temperature
  - Increase Impervious Surfaces
    - Urban Heat Island Effect
  - Mitigation
    - Selective Tree Planting

GHG Analysis Challenges

Limited data available

- Construction vehicles – estimate type, size, quantity of vehicles needed (excavators, dozers, dump trucks, etc.)
- Commute distance for construction workers

Mitigation options are often unknown at the EAW/EIS/AUAR stage

Upstream/downstream emissions may be difficult, depending on level of detail needed.

Future Requirements Expectations

- Upstream responsibilities – for example, carbon footprint of building materials
- Currently, EQB requirement is to report calculations. There is no threshold now: could be one in the future for good, neutral, bad emission thresholds.
- Change in GHG Global Warming Potential (GWP) values from EPA effective January 1, 2025
  - Need to double check SGEC tool for accuracy come January 1st
- Metropolitan Council Policy Changes regarding GHG
  - Imagine 2050 Policy Document
    - Land Use Objective 7: GHG inventory requirement

Lessons Learned

- Ask Questions Early in Process
- Keep Copies of Past Projects for Reference
- Ensure Proper Coordination with Traffic Analysis

Contact Information:

Liam Mitchell
Liam.Mitchell@stantec.com

Courtnay Bot
Courtnay.Bot@stantec.com

Mike Graham
Michael.Graham@stantec.com

Additional GHG expertise:
Ray Ramos
Ray.Ramos@stantec.com