DRAFT Guidance for Greenhouse Gas Impact Assessments under the Montana Environmental Policy Act

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Contents

Appendices

Purpose

The purpose of this document is to provide guidance to state agencies conducting the environmental analysis of projects pursuant to the Montana Environmental Policy Act (MEPA), § 75-1-101, et. seq., Montana Code Annotated (MCA), as amended by Senate Bill 221 (SB221; 2025 legislative session). This Guidance Document relates to the assessment of greenhouse gas (GHG) emissions and resulting impacts on Montana's environment. As directed by SB221 and resulting changes to MEPA: "The department of environmental quality shall develop a guidance document for use by state agencies to determine when a GHG assessment may be necessary. The guidance must include direction on methodologies for completing a GHG assessment. Prior to finalizing this guidance, the department shall provide public notice of the draft guidance and allow for public comment." This guidance applies to all state agencies conducting environmental reviews under MEPA.

To address these areas and help fulfill the statutory requirements, this Guidance Document includes direction on when to complete a GHG assessment pursuant to MEPA and methodologies to complete the GHG assessment. This guidance supplements existing MEPA procedures and should be used in conjunction with standard MEPA analysis requirements. In addition to the methodologies for assessing GHG emissions and impacts described in the following sections, four appendices are provided: (1) Calculating GHG Emissions from Proposed Projects Related to Ecological Functions, (2) Secondary Impacts from GHG Emissions, (3) Methods and Means of Quantifying Costs Related to GHG Emissions, and (4) Cumulative Impacts from GHG Emissions.

Background

Consideration of GHG emissions and corresponding climate impacts had previously been prohibited in environmental reviews since 2011 by a provision of MEPA (known as the MEPA Limitation). The MEPA limitation was amended by the state legislature in 2023 to more explicitly prohibit "an evaluation of greenhouse gas emissions and corresponding impacts to the climate in the state or beyond the state's borders."

In December 2024, the Montana Supreme Court (Court) in *Held v. State of Montana* ruled 6-1 that the prior prohibition violates Montanans' constitutional right to a clean and healthful environment. In January 2025, *MEIC v. DEQ* further held that in the absence of a prohibition on DEQ considering GHG emissions under MEPA, it would be arbitrary and capricious for the agency to not consider this impact for a generating station expected to emit a large amount of GHG emissions. .

The 2025 Montana Legislature responded by passing SB221, signed into law on May 1, 2025, which requires state agencies to evaluate GHG impacts for fossil fuel projects while limiting analysis to proximate impacts on Montana's environment.

This guidance provides direction for conducting GHG assessments under MEPA following these legislative and legal updates.

Held v. State of Montana (2024)

Held v. State of Montana (2024 MT 312, DA 23-0575) is a constitutional climate case decided by the Court on December 18, 2024, following the First Judicial District Court's August 14, 2023, ruling (CDV-2020-307). The case involved 16 youth plaintiffs who sued the State of Montana for violating their constitutional right to a "clean and healthful environment" by prohibiting the consideration of GHG emissions in environmental reviews. The case invoked Montana's Constitution, specifically Article II, Section 3, "All persons are born free and have certain inalienable rights. They include the right to a clean and healthful environment..." and Article IX, Section 1: "The state and each person shall maintain and improve a clean and healthful environment in Montana for present and future generations."

The Court affirmed the right of the youth plaintiffs in a 6-1 decision to a "clean and healthful environment" under Article II, Section 3 and Article IX, Section 1 of the Montana Constitution, which includes this right among "inalienable rights." The Court found the plaintiffs had proper standing, noting their constitutional rights were being violated by the state's exclusion of considering GHG emissions in environmental reviews.

This decision included the recognition that the constitutional right to such an environment encompasses the right to a "stable climate system" capable of sustaining human lives and liberties. The Court declared unconstitutional the provision in MEPA that prohibited state agencies from considering GHG emissions or climate change impacts when reviewing energy-related projects and permits. The Court's opinion was that Montana's constitutional environmental protections are broad enough that the state cannot categorically exclude consideration of GHG emissions from environmental reviews when making permitting decisions for fossil fuel projects.

MEIC v. DEQ (2025)

Montana Environmental Information Center (MEIC) and the Sierra Club v. Montana Department of Environmental Quality (DEQ) and NorthWestern Energy (Case No. DV21-01307) was decided by the Court on January 3, 2025, following a lower court's April 6, 2023, ruling (DV-56-2021-0001307). This case involved a challenge to an air quality permit for the Laurel Generating Station, a 175-megawatt natural gas-fired power plant being constructed by NorthWestern Energy near the Yellowstone River in eastern Montana.

The environmental groups challenged DEQ's issuance of the air quality permit on two primary grounds: (1) DEQ did not adequately analyze environmental impacts under MEPA and (2) the 2011 MEPA limitation violated Montana's constitutional environmental protections. The contested provision stated that environmental review under MEPA "may not include a review of actual or potential impacts beyond Montana's borders [and] may not include actual or potential impacts that are regional, national, or global in nature."

The Court issued its decision in *MEIC v. DEQ* on January 3, 2025, determining that DEQ must analyze GHG emissions when the project is expected to have a large amount of GHG emissions. However, the Court explicitly stated that not every state action requires a GHG emissions analysis: "We did not hold in Held, and do not hold here, that DEQ is required to analyze GHG emissions for every potential state action."

Senate Bill 221

SB221, enacted as part of the 2025 Montana legislative session, makes significant revisions to MEPA, focused notably on the treatment of GHG emissions in environmental reviews. The bill was signed into law on May 1, 2025.

SB221 narrows the scope of environmental review under MEPA to only include the proximate environmental impacts from a project. This means downstream emissions are expressly excluded from consideration in MEPA reviews.

The bill mandates that an assessment of GHG emissions be included in environmental reviews for fossil fuel-related projects or in other projects where the agency determines the assessment is necessary. These gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). SB221 establishes some limitations on the scope of these GHG assessments. Upstream and downstream emissions are explicitly excluded from analysis; reviews must focus on "proximate" impacts rather than the broader categories of direct, secondary, and cumulative effects previously required; and assessments are restricted to impacts within Montana's environment. The bill amends three sections of the MCA: Section 75-1-201 (MEPA policy and purpose), Section 75-1-202 (definitions), and Section 75-1-220 (environmental review procedures).

MEPA Workgroup and Findings

The MEPA Workgroup was established by Montana DEQ in January 2024, following public listening sessions held in late 2023, which followed the 2023 district court decision in *Held v. State of Montana*. The MEPA Workgroup's primary purpose was to foster public and stakeholder engagement on MEPA implementation, identify challenges and opportunities in MEPA implementation, develop clear and actionable recommendations for future state policymakers, and address whether and how MEPA implementation might be improved or modernized. The

MEPA Workgroup consisted of 20 diverse members including state legislators, private citizens, industry representatives, higher education representatives, non-governmental organizations, and youth representatives. The MEPA Workgroup identified major MEPA implementation challenges and developed recommendations that provided a foundation for potential MEPA reform.

DEQ's experience gained through the MEPA Workgroup identified the need to document existing research that led to the four appendix topics provided with this guidance: (1) Calculating GHG Emissions from Proposed Projects Related to Ecological Functions, (2) Secondary Impacts from GHG Emissions, (3) Methods and Means of Quantifying Costs Related to GHG Emissions, and (4) Cumulative Impacts from GHG Emissions. These topics are summarized below and detailed in the attached appendices, which provide agencies with guidance needed to implement GHG assessments. This guidance first explains when to conduct a GHG assessment as required by SB221 followed by the technical approach for GHG impact assessments.

When to Conduct a Greenhouse Gas Impact Assessment

MEPA, as amended by SB221, requires that state agencies must conduct a GHG assessment for all fossil fuel projects. Additionally, as provided by MEPA under the Administrative Rules of Montana (ARM) 17.4.609(3)(d)–(e), state agencies may determine on a case-by-case basis that an evaluation of impacts is required for other types of projects if the impacts (e.g., GHG emissions) are potentially significant . DEQ has determined that a GHG impact assessment may be performed for projects involving:

- Stationary Combustion Devices
- Construction and Mobile Engine Operation
- Ecological Functions

Projects other than fossil fuel activities, including, but not limited to, the project types listed above, need only be analyzed at agency discretion following the Court's ruling in *MEIC v. DEQ* that "we did not hold in Held, and do not hold here, that DEQ is required to analyze GHG emissions for every potential state action." The recommended methods for these assessments are discussed in the following sections.

Fossil Fuel Projects

Per 75-1-201(2), MCA, agencies are required to conduct a GHG impact analysis for proposed actions that meet the criteria defining a fossil fuel project. Per the definition of fossil fuel activities from § 75-1-220, MCA, as amended by SB221, "fossil fuel activity" means a proposed action that authorizes the mining of coal, drilling for oil or natural gas, production of oil or natural gas, compression of oil or natural gas, or burning of coal, oil, or natural gas to generate energy for electricity. These projects typically result in large amounts of GHG emissions that could contribute to climate change. Exclusions to this requirement include activities such as burning biomass for electricity or industrial purposes, transportation-related activities (including rail), or water quality and quantity-related leases, permits, licenses, certificates, or other entitlements for fossil fuel activities. State agencies should evaluate each project to determine the necessity of a GHG impact assessment based on these criteria.

When conducting a GHG impact assessment for fossil fuel projects, it is important to evaluate the various sources of GHG emissions specific to the type of project. Example emission sources for key types of fossil fuel projects are provided below.

For fossil fuel-fired power plants or electric generating units, the assessment could potentially include emissions from combustion sources, fugitive emissions, mobile sources, and waste management. Examples of combustion sources include boilers, combustors, and process heaters and engines used for continuous generation of electricity, emergency power, and fire pumps. Emergency flaring of waste gas activities may also be considered where applicable. Examples of fugitive emissions are natural gas leaks from pipelines, valves, flanges, or other equipment, and methane emissions from coal storage and handling. Mobile sources in the context of a fossil fuel-fired power plant project could include on-site vehicles such as maintenance trucks, coal/ash handling equipment, and material transport vehicles. Emissions from waste management could include wastewater treatment at the project site. Similarly, for coal mining and oil and gas projects, the assessment could potentially include GHG emissions from combustion sources, fugitive emissions, and mobile sources.

Stationary Combustion Devices

If a proposed action creates direct emissions from stationary combustion devices, then the reviewing agency may consider conducting a GHG emissions assessment. The U.S. Environmental Protection Agency (EPA 2025d) defines combustion sources as devices that combust solid, liquid, or gaseous fuel, generally for the purposes of producing electricity, generating steam, or providing useful heat or energy for industrial, commercial, or institutional use; or reducing the volume of waste by removing combustible matter. Stationary fuel combustion sources include, but are not limited to, boilers, simple and combined-cycle combustion turbines, engines, incinerators, and process heaters.

Examples of stationary combustion devices include, but are not limited to:

- Incinerators
- Boilers
- Nonmobile engines

- Turbines
- Industrial heaters
- Industrial furnaces
- Kilns
- Ovens/dryers
- Waste gas flaring
- Thermal oxidizer/vapor combustor unit

Construction and Mobile Engine Operation

If construction related to the proposed action would require prolonged or continuous operation of GHG-emitting construction equipment or mobile engines, then the reviewing agency may consider including a GHG emissions assessment in its MEPA review. If construction is temporary in duration and the informed judgment of the agency suggests that GHG emissions from this construction would not have the potential to be significant, then a GHG impact analysis may not be necessary.

Examples of GHG emission sources from construction activities include:

- Mobile equipment: Excavators, bulldozers, graders, dump trucks, concrete mixers, cranes, material hauling trucks, and specialized machinery such as tunnel boring machines and pile drivers
- Stationary equipment: Generators, concrete batch plants, asphalt plants, crushing and screening equipment, and heating systems
- Support operations: Compressors, water pumps, and site lighting systems

Ecological Functions

Ecological functions are the natural interactions and processes that maintain a healthy ecosystem and its ability to provide benefits to humans and organisms. One important ecological function performed by forests and grassland ecosystems in Montana is the regulation of the carbon cycle, contributing to the long-term GHG balance in the atmosphere. GHG balance refers to the net difference between the GHGs emitted into the atmosphere and the GHGs removed or absorbed within an ecosystem over a defined period. GHG fluxes reflect the rate of transfer of GHGs between different components of the Earth system or pools, such as the atmosphere or the land.

Land management activities may impact ecological functions, and particularly the carbon cycle, either by facilitating carbon sequestration (e.g., carbon storage or sink) or by disturbance (e.g., vegetation management), which, in some cases, may initially increase GHG emissions but ultimately may balance the carbon cycle over the long term. Land management activities that are implemented by state agencies in Montana (primarily the Montana Department of Natural Resources and Conservation and Montana Fish, Wildlife, and Parks) in forested ecosystems and grasslands include timber sales, controlled or prescribed burns, forest thinning, noxious weed management, and grazing management. These actions may initially release CO_2 and other GHGs due to vegetation removal, combustion, or soil disturbance in the ecosystem. However, these actions often enhance long-term ecological function and ecosystem resilience, such as reducing wildfire risk, promoting native vegetation recovery and regrowth, improving forage quality, and increasing carbon uptake in regrowing biomass and soils. Land management activities including conservation easements, which may be on private lands, and habitat restoration activities, also play a role in long-term carbon sequestration. These activities may include replanting native species, wetland enhancement, erosion control, and soil rehabilitation. These activities typically involve fewer immediate emissions but contribute to enhanced ecosystem services over time, including improved carbon storage, water regulation, and biodiversity support. If the proposed action might impact the Earth's ecological carbon cycle, such that the public would be benefited by information regarding natural storage of carbon, then the reviewing agency could consider conducting a GHG impact analysis for that project.

Technical Approach for Conducting Greenhouse Gas Impact Assessments

Direct Impacts

Direct impacts are those that occur at the same time and place as the action that triggers the effect. Based on 75-1-201(1)(b)(iv)(A), MCA, the direct impacts that should be assessed when conducting a GHG assessment are defined as "proximate environmental impacts" of the proposed action. The scope is geographically limited to impacts occurring on Montana's environment. The assessment explicitly excludes upstream, downstream, and other indirect actions (as defined by 75-1-220(10)(b)(i) and (ii), MCA) that occur independently or are caused in part or exclusively by the proposed action, as well as any actions that would occur regardless of whether the proposed action is implemented. This means the GHG assessment should focus on the direct proximate environmental impacts that are immediately attributable to the proposed action itself, rather than broader consequential or lifecycle impacts that might occur outside Montana's jurisdiction or through related but separate activities. Under MEPA, looking at direct impacts involves assessing those impacts directly emitted from sources controlled or owned by a facility or project.

The EPA Simplified GHG Emissions Calculator

Best for: estimating GHG emissions for small- to medium-sized projects with routine emission sources

Website: https://www.epa.gov/climateleadership/simplified-ghg-emissions-calculator

The EPA Simplified GHG Emissions Calculator can be used to estimate direct GHG emissions from a proposed action (EPA 2025a). It is a free, user-friendly, Excel-based tool designed primarily for small- to medium-sized projects to estimate and inventory their annual GHG emissions. State agencies should first determine the direct emission sources associated with the project. Then, activity data for a full annual period are provided to the calculator, such as fuel consumption for stationary combustion sources, vehicle fuel use, and travel-related activities. Users enter these data into designated input fields in the Excel-based calculator. The tool automatically calculates GHG emissions using emission factors sourced from EPA's Emission Factors Hub, converting GHGs into a common metric of metric tons of CO_2 equivalent (CO_2e). The calculator organizes emissions into categories such as stationary combustion, mobile sources, refrigeration and air conditioning leakage, fire suppression systems, purchased gases, electricity, steam or heat, business travel, employee commuting, and waste, among others. The calculator provides direct (Scope 1), indirect from purchased energy (Scope 2), and other indirect emissions (Scope 3); however, MEPA excludes upstream, downstream, and other indirect actions that occur independently or are caused in part or exclusively by the proposed action per 75-1-220(10)(b)(i), MCA. Therefore, only the direct (Scope 1) emissions need to be assessed. Additionally, the tool provides conversion factors, units guidance, and help sheets to assist with data collection and emission calculations.

The EPA Simplified GHG Emissions Calculator may be appropriate for small- to medium-sized projects with routine emission sources. For fossil fuel projects and other large complex projects, the EPA Simplified GHG Emissions Calculator might not be adequate to cover all emissions sources. For large fossil fuel projects or complex projects where the EPA Simplified GHG Emissions Calculator is insufficient, the calculator may be supplemented with other resources such as EPA's GHG Emission Factors Hub (EPA 2025b) and EPA AP-42: Compilation of Air Emissions Factors from Stationary Sources (EPA 2025c), discussed below.

EPA GHG Emission Factors Hub

Best for: estimating GHG emissions from stationary and mobile combustion sources

Website: https://www.epa.gov/climateleadership/ghg-emission-factors-hub

The EPA GHG Emission Factors Hub (EPA 2025b) provides default emission factors that may be used in the GHG emission inventory development. This tool includes emission factors derived from the EPA's Greenhouse Gas Reporting Program, the Emissions & Generation Resource Integrated Database, the Inventory of U.S. Greenhouse Gas Emissions and Sinks, and the Intergovernmental Panel on Climate Change (IPCC). These emission factors cover a wide range of emission sources including stationary and mobile combustion, electricity, and waste.

Emissions can be estimated by applying activity data (e.g., fuel use) to the appropriate emission factors corresponding to the specific gases involved (CO_2, CH_4, and N_2O), enabling conversion of raw activity data into quantifiable emissions expressed as CO_2e.

EPA AP-42: Compilation of Air Emissions Factors from Stationary Sources

Best for: obtaining GHG emission factors for various combustion, biogenic, and waste stationary sources

Website: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors-stationary-sources

GHG emission factors may be obtained from AP-42 (EPA 2025c) for some categories of emissions sources, primarily combustion sources (e.g., natural gas and fuel oil combustion); biogenic sources (e.g., enteric fermentation and soil); and waste. These emission factors are derived through a combination of actual source testing data, material balance analyses, and engineering calculations. Updates by the EPA have generally aligned with EPA's Greenhouse Gas Reporting Program methodologies.

EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks

Best for: estimating and benchmarking GHG emissions using nationally consistent and standardized data

Website: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022

The EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks (EPA 2024) can be used to estimate GHG emissions from various sources. Specifically, the EPA Inventory offers nationally consistent data on GHG emissions and sinks by source, sector, and gas type. The EPA Inventory provides methodologies and data necessary to estimate GHG emissions in a scientifically accepted and standardized manner for various sectors. It also helps establish a baseline for emissions and enables comparison of project-related emissions to broader state and national emission levels.

Calculating GHG Emissions from Proposed Projects Related to Ecological Functions

Appendix 1 was developed to help MEPA practitioners determine the appropriate methodologies, models, and best practices to use to calculate GHG emissions associated with projects that involve maintenance or promotion of ecological functions. The appendix outlines appropriate uses, data availability needs and experience level needed for six models. The model or tool used by MEPA practitioners will depend on the type of land management activity and the available data. MEPA practitioners can determine the appropriate model or tool to use by first identifying the type of projects for which emissions need to be calculated and determining the level of data and resource availability for their project. The models and tools selected do not encompass all available models, tools or studies: DEQ has selected models that most closely aligned with the objective of calculating GHG emissions for land management activities in Montana for MEPA purposes. A short summary of the six models or tools covered in Appendix 1 is provided below.

BlueSky Framework

Best for: prescribed and controlled burns

Website: https://tools.airfire.org/playground/v3.5/emissionsinputs.php

BlueSky Framework is a web-based modular framework that links fire and site-specific information to produce emissions estimates for prescribed and wildland burns. BlueSky provides an estimate of the initial emissions fluxes with moderate input needs when defaults are used. The tool computes emissions from fire events but does not include vegetation regrowth or carbon-stock calculations. If net GHG emissions over time are required, it could be paired with a separate regrowth or restoration method, such as the FLR Carbon Storage Calculator (Winrock International 2025), which is also discussed below. Spatial scale typically ranges from project site to regional estimates. The tool estimates the immediate emission fluxes (CO_2 and CH_4) associated with fire activity reported in tons per acre. Best suited for practitioners with moderate data availability and experience with data analysis.

Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3)

Best for: all forest management practices

Website: https://natural-resources.canada.ca/climate-change/climate-change-impacts-forests/carbon-budget-model

The CBM-CFS3 is a comprehensive forest carbon accounting framework used to simulate the impact of forest management scenarios on carbon sequestration and emissions (Kurz et al. 2009). Because CBM-CFS3 records each disturbance and then projects post-disturbance carbon uptake, it would allow MEPA practitioners to show how an action that produces an immediate emissions pulse (e.g., prescribed burning or forest thinning) is offset by sequestration as the stand recovers or is managed differently. The model outputs annual and cumulative carbon totals for all major GHG pools, enabling comparison of baseline and action scenarios over any analysis horizon. This makes it possible to demonstrate the net carbon sequestration potential of a project while explicitly accounting for ecological functions that may offset initial GHG emissions, satisfying the objective to present total long-term emissions rather than just the initial GHG pulse. CBM-CFS3 provides estimates for all three major GHGs associated with forest carbon cycling including CO_2, CH_4, and N_2O. Extensive data inputs and careful data preparation are required, but the resulting simulation output provides a rigorous evaluation of GHG emissions associated with forest-management practices under MEPA.

Fuel and Fire Tools (FFT): Fire emission Production Simulator (FEPS)

Best for: prescribed and controlled burns

Website: (FFT) https://depts.washington.edu/fft/ and https://www.frames.gov/catalog/17633 (FEPS) https://research.fs.usda.gov/pnw/projects/feps and https://www.frames.gov/catalog/7173

FEPS is distributed as one of the calculators in the USFS FFT desktop suite (Prichard 2018). FEPS could be used in the MEPA process to quantify GHG emissions for proposed prescribed or controlled burns at the project scale. Fuel-load and environmental data inputs from FFT could be used to estimate GHG emissions (CO_2 and CH_4) for prescribed burns and wildfires in forest, shrub, and grassland fuels. Results from this model could then be paired with a separate regrowth or restoration method such as the FLR Carbon Storage Calculator (see description below) to represent post-fire recovery GHG trajectory. This tool would be suitable for a range of data availability and experience levels.

LULUCF Module

Best for: Forest activities that lead to carbon flux (prescribed/controlled burns, forest thinning, etc.) and grassland management

Website: https://www.epa.gov/statelocalenergy/download-state-inventory-and-projection-tool.

The LULUCF module is one of ten State Inventory Tools (SITs) that were developed in conjunction with EPA's Emissions Inventory Improvement Program (EIIP). The LULUCF module is a macro-enabled Excel workbook that compiles annual GHG emissions and removals from land use, land use change, and forestry using methods consistent with the *Inventory of U.S. Greenhouse Gas Emissions and Sinks* (ICF 2024). For MEPA analyses, the best use of the LULUCF module is any forest or grassland activity that leads to carbon flux where annual GHG emissions accounting is needed and data inputs can be kept moderate by relying on defaults or increased where state-specific data justify refinement (ICF 2024). The LULUCF module is broken down into six sections representing different sinks and sources of GHG emissions: forest carbon flux, urban trees, N_2O from settlement soils, non-CO_2 emissions from forest fires, carbon storage in landfilled yard trimmings and food scraps, and agricultural soil carbon flux. The LULUCF module calculates annual CO_2, CH_4, and N_2O emissions. This module may require a greater experience level because users must have familiarity with the use of Excel workbooks and follow multiple steps to obtain estimates.

COMET-Planner

Best for: grazing management, forest restoration, and conservation easement

Website: https://comet-planner-cdfahsp.com/

COMET-Planner is a web-based GHG evaluation tool developed by Colorado State University in partnership with the USDA Natural Resources Conservation Service (NRCS; Swan et al. 2020). In the context of MEPA, COMET-Planner would be helpful to estimate GHG fluxes associated with land management activities that are likely to increase the density of vegetative growth on the land. COMET-Planner can serve as a screening tool to estimate the direction and approximate magnitude of net GHG effects from adopting NRCS Conservation Practice Standards (CPS) in forest-related restoration and grazing management. The adoption of a conservation practice is compared to a baseline for the generation of a GHG estimate. Approximate carbon sequestration and GHG emission reduction estimates are provided in COMET-Planner in tons of CO_2e per year for CO_2, CH_4, N_2O, and total CO_2e. Data input needs are moderate to low because users select the appropriate CPS and area in acres directly within the web interface rather than compiling stand-level inventories or running process models.

FLR Carbon Storage Calculator

Best for: forest restoration and conservation easement

Website: https://winrock.org/flr-calculator/

The FLR Carbon Storage Calculator is a public web-based tool developed by Winrock International to estimate carbon removed by forest landscape restoration activities using literature-derived accumulation rates synthesized by Bernal et al. (2018). The calculator covers three activity types applicable to Montana's ecosystems, including natural regeneration, planted forests and woodlots, and agroforestry. Data inputs required include annual areas restored per year and up to 20 years, and outputs are annual and cumulative CO_2 sequestered for that period (Winrock International 2025). Users select geography (country and state), select species if calculations are for plantations and woodlots, and enter annual hectares restored for up to 20 years. Species options to select from are limited to eucalyptus, other broadleaf, oak, pine, and other conifer. Therefore, this method may not be suitable if a greater level of specificity is needed or if the species are not specific to the area being evaluated. The output provided by the tool includes annual and cumulative results in metric tons of CO_2 over a 20-year horizon (Bernal et al. 2018; Winrock International 2025). Data inputs are intentionally low because the method applies published activity and region-specific accumulation factors rather than site-specific growth modeling.

Secondary Impacts

Secondary impacts are defined in ARM 17.4.603(18) as "a further impact to the human environment that may be stimulated or induced by or otherwise result from a direct impact of the action." These are impacts that occur at a different location or later time than the proposed action that triggers the effect. MEPA excludes upstream, downstream, or other indirect actions that occur independently or caused in part or exclusively by the proposed action per 75-1-220(10)(b)(i), MCA.

Because GHGs are well-mixed in the atmosphere and climate change is driven by the cumulative total of global emissions, it is difficult to trace specific local outcomes (e.g., a Montana heatwave) back to any single project. Nevertheless, every project's GHG emissions incrementally add to global GHGs and, thus, to cumulative climate impacts.

Agencies can provide a qualitative discussion in their GHG analysis that presents a project's emissions within the broader context of global climate change, acknowledging the cumulative nature and impacts of climate change as well the inherent difficulty of attributing precise local impacts to one source, as discussed in detail in Appendix 2. Secondary Impacts from GHG Emissions. To provide a quantitative perspective on potential climate impacts from projects with large GHG emissions, DEQ recommends applying the Model for the Assessment of Greenhouse Gas Induced Climate Change (MAGICC). MAGICC is a reduced-complexity climate model that reproduces key Earth-system processes while remaining computationally efficient and freely accessible online (https://live.magicc.org/). MAGICC has been used by the IPCC and EPA to analyze emissions scenarios and temperature outcomes. The approach involves (1) running MAGICC with an unmodified global emissions pathway; (2) creating a second simulation in which the project's annual emissions are subtracted from that pathway; and (3) calculating the difference in projected global mean surface temperature between the two runs. The resulting temperature difference offers a physically based estimate of the project's marginal contribution to future global temperature change. Further information regarding secondary impacts assessment is provided in Appendix 2 along with results for selected GHG emission magnitudes that may be used by agencies as an approximate measure of impacts.

One method that has been used in some analyses to estimate the economic impacts due to climate change is the Social Cost of Greenhouse Gases (SC-GHG). The SC-GHG represents the marginal cost of emitting 1 metric ton of a GHG and estimates the marginal benefit of reducing emissions by the same amount. The SC-GHG calculation incorporates socioeconomic impacts, emissions, climate changes, damages, and discount rates, though it faces challenges due to uncertainties and non-inclusion of certain physical climate. Applying SC-GHG values locally can be challenging, as highlighted by conflicts with Montana's legislative changes restricting evaluations of GHG emissions impacts beyond Montana's environment. Further discussion regarding costs related to GHG emission is provided in Appendix 3. Methods and Means of Quantifying Costs Related to GHG Emissions.

The SC-GHG metric has several limitations and large uncertainties including coarse spatial resolution, uncertainties in the functions used to estimate damages, and uncertainty in estimated costs resulting from varying discount rates. In addition, *Belk v. Mont. Dep't of Envtl. Quality* (2022 MT 38, DA 21-0117) clarified that MEPA does not require quantitative economic analysis as it "require[s] assessments of impacts on human populations—including health, agriculture, tax bases, and culture—but they *do not require quantitative economic forecasts*" (emphasis added). In summary, SC-GHG as a metric to quantify the cost of GHG emissions has several limitations and uncertainties and is not required under MEPA. This is discussed in more detail in Appendix 3.

Cumulative Impacts

Cumulative impacts are defined in § 75-1-220(4) as "the collective impacts on Montana's environment of the proposed action when considered in conjunction with other past and present actions related to the proposed action by location or generic type." ARM 17.4.603(7) further elaborates that "[r]elated future actions must also be considered when these actions are under concurrent consideration by any state agency through preimpact statement studies, separate impact statement evaluation, or permit processing procedures."

In addition to other projects being considered, agencies may use the following data sources to help identify other types of cumulative emission sources in Montana : (1) the EPA State Inventory Tool (SIT), which provides statewide emissions tables and graphics; (2) the EPA Facility Level Information on Greenhouse Gases Tool (FLIGHT) database, providing facility-level emissions for all Montana sources that exceed 25,000 metric tons of CO_2e per year; and (3) United States Bureau of Land Management fossil-fuel emissions projections that capture federally regulated sources.

Second, agencies may cite broader scientific assessments, including IPCC AR6, the Fifth U.S. National Climate Assessment, and Montana-specific reports on state-level climate change and public health, to report observed and projected trends in and impacts on climate.

Third, climate-viewer tools such as the National Climate Change Viewer, Climate Indicator Map Explorer, and other interactive platforms may be used for spatial visualization of temperature, precipitation, and impact indicators that correspond to projected emissions trajectories at a project location.

By integrating these datasets, agencies can summarize statewide or regional climate impacts that the project's emissions would incrementally contribute to. Refer to Appendix 4. Cumulative Impacts from GHG Emissions for further information.

Summary

This document provides guidance for state agencies in Montana when conducting environmental impact analyses related to GHG emissions. Pursuant to recent legislative and judicial developments, specifically SB221 and recent court rulings such as *Held v. State of Montana* and *MEIC v. DEQ*, this Guidance Document outlines methodologies for GHG assessments and resources that can be used to inform the analysis.

MEPA, as amended by SB221, mandates that state agencies conduct a GHG assessment for all fossil fuel projects. Under existing MEPA requirements provided by ARM 17.4.609 (3)(d)–(e), agencies may require such assessments for other projects that warrant further evaluation.. GHG impact assessments may be completed for projects involving stationary combustion, construction and mobile engine operations, and ecological functions. Other projects may be analyzed at the agency's discretion.

Under 75-1-201, MCA, the GHG assessments focuses on proximate environmental impacts confined to Montana's environment, excluding broader actions such as upstream and downstream activities. The EPA Simplified GHG Emissions Calculator is recommended for small- to medium-sized projects, calculating emissions from various categories using activity data and emission factors. For larger and more complex projects, these data may be supplemented with EPA's AP-42 Compilation of Air Emissions Factors and the EPA GHG Emission Factors Hub. Additionally, the EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks offers national data as another source of GHG emission estimates for inventory development and cumulative impact analysis.

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Appendices

Appendix 1. Calculating GHG Emissions from Proposed Projects Related to Ecological Functions

Appendix 2. Secondary Impacts from GHG Emissions

Appendix 3. Methods and Means of Quantifying Costs Related to GHG Emissions

Appendix 4. Cumulative Impacts from GHG Emissions