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440.01 Energy Background

On large-scale projects with potentially substantial energy impacts and/or emissions of greenhouse gasses, usually those which require Environmental Impact Statements (EIS), the Washington State Department of Transportation (WSDOT) analyzes the major direct and/or indirect effects of each project alternative on the energy needs for construction and facility operations and the potential for conservation measures. In some cases, facility operations may include new buildings, such as transit terminals, when constructed as part of the project.

For transportation projects, the major greenhouse gas is carbon dioxide (CO₂) from the combustion of fossil fuels. WSDOT requires a greenhouse gas (GHG) analysis as part of an energy analysis for EISs. For non-EIS level documentation, the potential for impacts, the level of public interest, and the type of data available must all be considered to determine whether a qualitative or quantitative GHG analysis is prepared. The framework for this decision is outlined in the *WSDOT Guidance – Project-Level Greenhouse Gas Evaluations under NEPA and SEPA* that is required for use on all projects where WSDOT is the lead or co-lead agency. Consult with the WSDOT Air Quality and Energy Policy Specialist to determine the appropriate level of effort.

Energy analysis is not typically required for non-EIS level documentation because energy consumption is typically not a key decision-making criterion unless reduction of energy consumption or minimization is a project goal, such as in mass transit or commuter travel enhancement projects. More often, other project benefits like congestion reduction, improved travel time, and improvements in level-of-service (LOS) are project goals and reduction of energy consumption is a collateral benefit.

If your project does not require an energy analysis, GHG analysis should be provided in the context of “cumulative effects.” More information on energy is available on the WSDOT [Energy](#) web page.

440.02 Documentation and Modeling Requirements

For an EIS, a quantitative GHG analysis is recommended and should be included in the energy analysis. The GHG and energy calculations can be prepared separately then combined in the final energy analysis. When analyzing GHG emissions for an energy analysis, consult with the WSDOT Air Quality and Energy Policy Specialist. The [Energy Checklist](#) describes the specific information required when an energy analysis is required. A summary of these requirements follows.

(1) **Affected Environment**

Describe existing energy consumption from facility operations, where applicable.

(2) **Energy Consumption**

Operations – Compare the energy used on the project for the existing condition and build and no-build alternatives in the design year. Energy should be described in terms of British Thermal Units (BTU) or quantities of fuel.

- Energy consumed by vehicles operating on the facility; including effects of project on traffic flow, vehicle miles traveled (VMT), induced growth, and identification of pay-back period, where applicable.
- Effect of energy consumed on the facility on regional energy production and consumption.
- Energy needed to maintain the facility, where applicable.
- Project's consistency with the state and/or regional energy plan, where applicable.

Construction – Describe the temporary effects of fuel consumption for construction of the project here and provide this information to the environmental manager for inclusion in the Construction Activity Impacts section of the EIS. The description should include the following:

- Effect of the project on local fuel availability during construction.
- Amount and source of materials and energy needed for project construction, to the extent known.
- Clarify whether additional energy sources need to be developed to support construction.

Overall – Describe overall energy costs or savings by alternative, including the combined energy from project construction and operations for all project alternatives.

(3) **Greenhouse Gas Emissions**

The process for evaluating GHG emissions associated with an individual transportation project is outlined in *Guidance for Project-Level Greenhouse Gas Evaluations Under NEPA and SEPA*. The guidance outlines the required format for both qualitative and quantitative analysis for operational, construction, embodied, and lifecycle emissions.

Current guidance separates the discussion of climate change and adaptation from the evaluation of GHG emissions on the project. See the WSDOT [Adapting to a Changing Climate](#) web page.

(4) **Conservation Measures and Mitigation**

The analysis should describe any recommended mitigation measures and commitments to stakeholders for the design, construction, and/or post-construction phases. The analysis should also describe whether additional mitigation measures were considered and why these were not included.

440.03 **Applicable Statutes, Regulations, and Guidance**

(1) **Federal**

- National Environmental Policy Act (NEPA) [42 USC 4321](#) and Federal implementing regulations [23 CFR 771](#) (FHWA) and [40 CFR 1500.1-1500.8](#) (CEQ).
- President’s [Executive Order 13423](#), *Strengthening Federal Environmental, Energy, and Transportation Management*.
- FHWA [Technical Advisory T 6640.8A](#) for NEPA documents.
- U.S. Department of Transportation Guidance on Fuel Consumption and Air Pollution, including [USDOT Order 5610.1C](#), *Energy Requirements for Transportation Systems*, and *Procedure for Estimating Highway User Costs, Fuel Consumption, and Air Pollution*.

(2) **State**

- State Environmental Policy Act (SEPA) and state implementing regulations [WAC 197-11](#) and [WAC 468-12](#).
- [Chapter 39.35D RCW](#) requires that new “major facility projects” achieve the Leadership in Energy and Environmental Design (LEED) silver building rating standard.
- [WSDOT Guidance – Project-Level Greenhouse Gas Evaluations under NEPA and SEPA](#).

440.04 **Non-Road Project Requirements**

The requirements to address energy requirements for non-road projects are assumed to be the same as for road projects.

440.05 **Abbreviations and Acronyms**

BTU	British thermal unit
CO ₂	carbon dioxide
EIS	environmental impact statement
GHG	greenhouse gases
LOS	level-of-service
NEPA	National Environmental Policy Act
SEPA	State Environmental Policy Act
VMT	vehicle miles traveled

440.06 Glossary

Greenhouse Gases (GHG) – Greenhouse gases absorb and emit radiation within the thermal infrared range. Common GHGs in the Earth’s atmosphere include water vapor, carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbons.

Operational GHG Emissions – “Tailpipe” GHG emissions from vehicles using the project facility or nearby facilities affected by the project.

Construction GHG Emissions – Primarily GHG emissions from the fuel used by the equipment that builds the project.

Embodied GHG Emissions – GHG emissions generated from the energy used to extract materials, fabricate them for construction, and transfer them to construction site. Embodied GHG emissions are also referred to as “cradle to site” GHG emissions.

Lifecycle GHG Emissions – Referred to as “cradle to grave emissions” that include embodied GHG emissions and GHG from energy used to demolish and/or dispose of materials after completion of usable life.