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440.01 Introduction

This chapter covers policy and procedures related to energy consumed in the operation of vehicles and maintenance of facilities, and energy invested in construction activities as well as resources such as materials used in construction. It also provides direction for considering greenhouse gases.

(1) *Summary of Requirements*

Energy may be addressed in NEPA/SEPA documents in a section describing energy and fuel consumption. It is also addressed in the “Irreversible and Irrecoverable Commitments of Resources” section, which discusses the commitment of natural, physical, human, and fiscal resources, including fossil fuels, labor, and highway construction materials (see **Chapter 412**).

According to FHWA technical guidance, for large-scale projects with potentially substantial energy impacts, the draft environmental document (usually an EIS) should discuss the major direct and/or indirect energy impacts and conservation potential of each alternative. The final environmental document should include conservation measures to be included in the preferred alternative. For most projects, only general construction and operational energy requirements and conservation potential impacts need to be discussed.

There are no other specific methodology requirements for addressing energy issues at this time, although there may be some requirements for evaluation and use of certain percentages of renewable energy at some point in the future.

*Web sites and navigation referenced in this chapter are subject to change. For the most current links, please refer to the online version of the EPM, available through the WSDOT Environmental Services Office (ESO) home page: <http://www.wsdot.wa.gov/environment/>

For transportation projects, the major greenhouse gas is carbon dioxide (CO₂) from the combustion of carbon-based fuels. WSDOT recommends a greenhouse gas (GHG) analysis as part of an Energy Discipline Report. The level of documentation, the potential for impacts, and the type of data available will all be considered when determining whether a qualitative or quantitative GHG analysis is preferred. The WSDOT Air, Noise, and Energy group should be consulted to determine the appropriate level of effort.

For more information, see the WSDOT Air, Acoustics and Energy Web site at:

☞ <http://www.wsdot.wa.gov/Environment/Air>

Also, see the WSDOT climate change Web page for the more information:

☞ <http://www.wsdot.wa.gov/Environment/climatechange/>

For projects that do not include a GHG analysis, a Discipline Report may not be required. Unless reduction or minimization of energy consumption is a project goal, such as in mass transit or commuter travel enhancement projects, energy consumption is typically not a key decision making criterion. More often other project benefits such as reduction of congestion, improved travel time, and improvements in level of service are considered as important transportation project goals and reduction of energy consumption is a more implicit benefit.

If your project does not require an energy study, a discussion of GHG should still be provided in the context of cumulative effects.

(2) **Abbreviations and Acronyms**

GHG – Greenhouse Gas

CO₂ – Carbon Dioxide

See also the general list of Abbreviations and Acronyms in **Appendix A**.

(3) **Glossary**

Renewable Energy – Fuels, electricity, or other energy forms made from oil seed, recycled biomass, wind, solar, hydroelectric (tidal/wave or current driven) geothermal, etc., that can be regenerated from existing natural resources.

Greenhouse Gases – Greenhouse gases are gases in an atmosphere that absorb and emit radiation within the thermal infrared range. Common greenhouse gases in the Earth's atmosphere include water vapor, carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbons.

440.02 **Applicable Statutes and Regulations**

See **Appendix D** for other statutes referenced in the EPM.

(1) **National Environmental Policy Act/ State Environmental Policy Act**

The National Environmental Policy Act (NEPA), 42 USC Section 4321, requires that all actions sponsored, funded, permitted, or approved by federal agencies undergo planning to ensure that environmental considerations such as impacts related to energy resources are given due weight in project decision-making. The State Environmental Policy Act (SEPA) mandates a similar procedure for state and local actions. Federal implementing regulations are at 23 CFR 771 (FHWA) and 40 CFR 1500-1508 (CEQ). State implementing regulations are in WAC 197-11 and WAC 468-12 (WSDOT). For details see **Chapter 410, Chapter 411, and Chapter 412**. By 2009 Washington's SEPA rules will include requirements relating to GHGs. Updates to NEPA covering GHGs may follow within the next five years.

(2) **President's Executive Order 13423: Strengthening Federal Environmental, Energy, and Transportation Management**

This order sets goals in the areas of energy efficiency, acquisition, renewable energy, toxics reductions, recycling, renewable energy, sustainable buildings, electronics stewardship, fleets, and water conservation. In addition, the order requires more widespread use of Environmental Management Systems as the framework in which to manage and continually improve these sustainable practices. The executive order is available at:

☞ <http://www.wsdot.wa.gov/Environment/Compliance/ExecutiveOrder.htm>

(3) **Other**

None identified.

440.03 Policy Guidance

Although greenhouse gas emissions (such as carbon dioxide) from the combustion of vehicle fuels/energy are currently unregulated federally, WSDOT has developed an "Interim Approach to Project-Level Greenhouse Gas and Climate Change Evaluations for Transportation Projects" that outlines the methodology and type of analysis recommended for assessing GHG emissions from the construction and operation of transportation infrastructure.

This approach is intended for projects where WSDOT is the lead or joint-lead agency. Frequent changes to the document are expected so coordination with WSDOT's Air Quality, Acoustics and Energy section is necessary to ensure the most current version is being referenced.

For additional information, see the WSDOT Air, Acoustics and Energy Web site at:

☞ <http://www.wsdot.wa.gov/Environment/Air/default.htm>

Also, see the USEPA Web site at:

☞ <http://yosemite.epa.gov/oar/globalwarming.nsf/content/EmissionsNational.html>

Also, see the State of Washington's climate change Web site hosted by the Department of Ecology at:

<http://www.ecy.wa.gov/climatechange/index.htm>

440.04 Interagency Agreements

None. See **Appendix E** for a guide to all interagency agreements referenced in the EPM.

440.05 Technical Guidance

(1) *Discipline Report*

Energy Discipline Reports provide the information required on large scale projects and are required when an EIS is required for a project. Energy discipline reports would rarely ever be involved for projects requiring other environmental documentation.

For an EIS, a quantitative GHG analysis is recommended and should be included in the Energy Discipline Report. The GHG and energy calculations can be prepared separately and combined. The WSDOT Air, Acoustics and Energy Program should be consulted on the preferred process for analyzing GHG emissions and incorporating the analysis in the Energy Discipline Report. More information can be found online at:

<http://www.wsdot.wa.gov/Environment/Air>

The Energy Discipline Report Checklist (**Exhibit 440-1**) serves as a general guide for preparing an energy discipline report.

Following are additional guidelines for analyzing energy resources.

(a) **Affected Environment**

Include existing energy consumption (if applicable).

(b) **Impacts**

Where the proposed project will cause no net increase in energy consumption, say so and briefly explain why. If the project will cause an increase in energy consumption, consider in terms of BTUs or quantities of fuel consumed:

- Direct energy consumed in operation of vehicles predicted to use the facility, compared to existing facility (if any). Identify pay-back period. Consider effects of increased or decreased smoothness of traffic flow.
- Energy consumed in maintenance of the facility, compared to existing facility (if any).

- Energy consumed in the region as a result of operation of the facility, compared to existing energy consumption. Consider effects of increased or decreased smoothness of traffic flow, vehicle miles traveled, and growth generated by the project.
- Impact on production of energy, if any.
- Combined energy used during construction versus energy used (or saved) during operation. Does one affect the other? Are they substantial when added together?
- Greenhouse gas calculations for EIS-level environmental documents. Currently, the EPA MOVES model is the preferred method to quantifying project-level GHG emissions for an EIS. The recommended process is outlined in WSDOT's "Interim Approach to Project-Level Greenhouse Gas and Climate Change Evaluations for Transportation Projects." The preparer of the Energy Discipline Report should coordinate closely with the WSDOT Air, Acoustics and Energy Program to prepare standard language and determine the appropriate level of GHG analysis for the project.
- Qualitative discussion of greenhouse gases as they relate to projects. The GHG discussion should include efforts currently underway in Washington State to reduce GHG emissions, a legislative update, effects of current project on GHG emissions, and when appropriate how the project will adapt to climate change (e.g., adaptations to rising sea level, increased fire potential, etc.). Contact the WSDOT Air Quality, Acoustics, and Energy Program staff for the most current guidance. See also **Chapter 412**.

(c) Mitigation

Describe:

- Mitigation measures and commitments during operation.
- Mitigation measures considered or available but not included, with reasons why.

(d) Construction Activity Impacts

All impacts associated with construction of the project are to be addressed in a Construction Activity Impacts section of the EIS. Provide the following information, as appropriate, for inclusion in that section.

Under "Impacts," consider temporary construction effects, such as:

- Impact on local fuel availability during construction.
- Energy resources needed and source of energy invested in construction activities and materials used in construction.

- Need to develop additional energy sources during construction.
- Any impact on production of energy.
- Discuss the construction-related contributions to GHG emissions according to the process outlined in WSDOT's "Interim Approach to Project-Level Greenhouse Gas and Climate Change Evaluations for Transportation Projects." WSDOT Air, Acoustics and Energy Program staff can assist with this process.

Under "Mitigation," describe:

- Mitigation measures and commitments during construction.
- Mitigation measures considered or available but not included, with reasons why.

(2) ***FHWA Technical Advisory***

FHWA Technical Advisory T 6640.8A (October 1987) gives guidelines for preparing environmental documents, including specifically the sections on energy impacts. For most projects, the draft EIS should discuss the general construction and operational energy requirements and conservation potential of various alternatives under consideration.

For large-scale projects with potentially substantial energy impacts, the draft EIS should discuss the major direct and/or indirect energy impacts and conservation potential of each alternative. Direct energy impacts refer to the energy consumed by vehicles using the facility. Indirect impacts include construction energy and such items as the effects of any changes in automobile usage. The alternative's relationship and consistency with a State and/or regional energy plan, if one exists, should also be indicated.

The final EIS should identify any energy conservation measures that will be implemented as a part of the preferred alternative.

For details, see the FHWA Web page at:

 <http://www.fhwa.dot.gov/legsregs/directives/techadvs/t664008a.htm>

(3) ***USDOT Guidance on Fuel Consumption and Air Pollution***

Evaluation of a project's effects on energy supply and demand may not be considered necessary because of the availability of fuel in a worldwide economy. However, the impacts of energy consumption can be estimated in terms of fuel consumption effects on air quality.

Refer to USDOT Order 5610.1C, Attachment 2, Page 12; and the following documents:

- *Energy Requirements for Transportation Systems*, USDOT, June 1980;
- *Procedure for Estimating Highway User Costs, Fuel Consumption, and Air Pollution*, USDOT, March 1980.

440.06 Permits and Approvals

None.

440.07 Non-Road Project Requirements

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

440.08 Exhibits

Exhibit 440-1 Energy Discipline Report Checklist

Exhibit 440-1

Energy Discipline Report Checklist

Project Name: _____

Contact Name: _____

Date Received: _____ Reviewer: _____

(SAT = Satisfactory; INC = Incomplete; MIS = Missing; N/A = Not Applicable)

Energy studies are conducted in compliance with federal regulations (U.S. DOT Order 5610 IC and FHWA – Technical Advisory T 6640.8A). The Energy Discipline Report Checklist is intended to identify the contents of a WSDOT energy study. The checklist may be modified as appropriate in consultation with the WSDOT Energy section.

An Energy Discipline Report can be highly detailed or extremely concise depending upon whether the level of impact or controversy is substantial or minimal. Project teams should take care to “right-size” the discipline report so it adequately addresses the impacts and controversy without over-analyzing or providing unnecessary information.

I. Summary

Summarize the analysis done and conclusions reached, with enough detail so the report can be included in the Energy Section of the environmental document. If this information is available in another section of a larger document, please provide those sections to the reviewer to complete the information.

SAT INC MIS N/A

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A. Objectives of the project. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | B. Methodology. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | C. Current energy environment, including impacts. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | D. Impacts of all alternatives, including the no-action alternative. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | E. Recommended mitigation. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | F. Comparison of alternatives relative to no-action. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | G. Written in “Plain Talk” language (see http://www.accountability.wa.gov/plaintalk/). |

II. Project Description

Include relevant aspects of each alternative:

SAT INC MIS N/A

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|----------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A. Project location description. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | B. Purpose and need. |

SAT INC MIS N/A

- C. Changes to existing alignment.
- D. Vicinity maps.
- E. Project maps.

III. Methodology

SAT INC MIS N/A

- A. Methods (indirect and direct) are identified.
- B. Use of methods are explained.
- C. Methods are appropriate for project.

IV. Affected Environment

SAT INC MIS N/A

- A. Impact (if any) on existing energy supplies.
- B. Location of existing fuel sources.
- C. Impact (if any) on future energy supplies.
- D. Affects on local energy production (if any).

V. Impact Analysis

SAT INC MIS N/A

- A. VMT (Vehicle Miles Traveled).
- B. BTUs for no-action and all alternatives.
- C. Quantities of fuel consumed for no-action and all alternatives.
- D. Comparison of all alternatives consumption relative to no-action.
- E. Table comparing the operational energy consumed for each alternative relative to no-action.
- F. Table comparing the construction energy consumed for each alternative relative to no-action.
- G. Construction costs.
- H. Construction equipment, construction materials, construction transportation (workers to and from site).
- I. Table comparing greenhouse gas quantities for each alternative for both operation and construction activities.

VI. Mitigation

For each alternative, include a discussion of the relative increase or decrease in fuel consumption compared to no-action for both indirect and direct consumption and the proposed mitigation (e.g., limiting the idling of construction equipment, encouraging carpooling, locating staging areas close to work site).

VII. References

SAT INC MIS N/A

A. _____

VII. Appendices

SAT INC MIS N/A

A. _____

VIII. Electronic Copies of Support Files

SAT INC MIS N/A

A. CD-ROM copy of Greenhouse Gas calculations and EPA MOVES model output files if applicable.

