Energy Analysis Procedure

Contacts

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Purpose

Identify project alternatives that possess the greatest potential for fuel conservation and to encourage that the planning, design, construction and operation of highways be conducted in a manner that conserves fuel.

In addition, an energy analysis can assist in the decision making process or as a project justification tool, and can determine if a proposed project will economically benefit the public. It can also be used in project staging decisions and detour considerations (fuel use by the public during construction), etc.

Threshold Criteria

A detailed energy analysis, including numerical computations of fuel use (BTU) requirements is required only for major projects (both urban and rural) with potentially significant energy impacts. The Analysis is required for both draft and final Environmental Impact Statements (EIS).

Examples

A. Construction of a major new segment of interstate highway.
B. Adding an additional lane, several miles or more long, to an existing interstate highway.
C. Upgrading of a substantial length of highway to a freeway/expressway.
D. Adding two or more lanes in one direction to a heavily used State Highway.
E. Other projects of similar magnitude to those listed in A through D.

Prepared Statement

Energy use Discussion

A "discussion" in general terms of the energy requirements and conservation potential of various alternatives under consideration is required for all other projects requiring an EIS. The discussion would typically not require a detailed analysis including computations, but must be reasonable and supportable.

Note: An energy analysis or discussion is not required for Environmental Assessment (EA) or Categorical Exclusions.

Calculation Procedures

1. **Detailed Energy Analysis.** This analysis should utilize state of the art energy consumption models and should include both direct and indirect energy use. Direct energy includes the fuel consumed by vehicles as they travel on the project. Indirect energy includes the fuel used to construct and maintain the project, including the energy embodied in the materials used for construction. The analysis should fully consider all project alternatives as well as the "no-build" alternative.

   MnDOT's Minnesota Instrastructure Carbon Estimator tool (MICE)

   [1] produces estimates energy consumption from both the construction process (direct and indirect) and from vehicles using the roadway. When MICE is used to estimate greenhouse gas (GHG) emissions from a project, it also estimates energy consumption, and the MICE results can be used to satisfy the energy analysis requirements. If EPA's MOVES model is being used for a mobile source air toxics (MSAT) analysis for the project, the MOVES model produces energy consumption estimates for vehicle usage as part of the MSAT calculations, and these estimates are more refined than those generated by MICE and should be used.

2. **Energy Discussion.** This discussion would include the results from MICE (and MOVES, if used). It should also include a text description of aspects of the project that affect the energy requirements and conservation potential of various project alternatives. Factors affecting energy use include; average speed, improvements in congestion, speed changes, grade, curvature, average age of vehicles (if affected by the project), reductions in delay due to
3. improved safety and reduced number of traffic incidents, and other miscellaneous factors.

[1] MICE tool link

4. **Assistance.** Assistance in developing the above analysis or information shall be obtained from MnDOT's Office of Environmental Stewardship Environmental Modeling and Testing Unit and FHWA Division Office.

Relationship to the HPDP

Since MICE automatically calculates energy consumption as part of a GHG analysis, any EIS document which includes a GHG analysis should also report energy consumption results, regardless of the percentage change.

Agencies Involved

The Federal Highway Administration and The Minnesota Department Of Energy And Economic Development Play Important Roles In Defining The Energy Analysis Procedures.

Guidelines/Regulations

FHWA
https://www.environment.fhwa.dot.gov/guidebook/vol2/doc7i.pdf
(see page 26) (October 30, 1987)