



Research Problem Statement

ODOT Research Section
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I. TITLE

17-055 Least Cost Planning Evaluations for Integrated Land Use and Transportation Planning

II. PROBLEM

The Oregon Jobs and Transportation Act mandates ODOT to develop a least cost planning (LCP) methodology that combines economic, social/health, and environmental (ESEE) analysis in evaluating transportation planning and infrastructure investment alternatives. ODOT's Mosaic project documents the LCP methodology and delivers a tool to help planning agencies/professionals apply LCP in practice. The Mosaic tool provides order-of-magnitude estimates of some impacts of land use and transportation plans and projects (CH2MHill, 2014), including performance evaluation of land use with two specific indicators (LU1) Population and Employment Change and Distribution and (LU2) Relative Land Value Change Compared to Base Case (besides a few other accessibility measures that are indirectly related to land use). While these two indicators are important measures of land use and are relatively easy to compute even for areas without integrated land use and transportation models, there is more useful information from land use models that can be utilized to inform LCP for agencies with operational land use models.

While benefit/cost computations to the transportation system are well documented (including the Mosaic project), the research into measuring benefit/cost of the land use system is much less developed. Integrated land use and transportation models produce detailed socio-economic and land use outputs, but scant attention has been paid to user benefits and costs related to policy decisions that affect residential and non-residential production choices. Missing from benefit/cost analysis is an explicit accounting of residential consumer surplus for housing choice decisions, for example. Land use policies shape regional and statewide development patterns, but we don't know if these patterns actually yield efficient outcomes from a ROI standpoint based on transportation investment that redirect land use. Objective measures of user benefit/cost and derived ROI indicators are needed to complement the performance measures of the transportation system.

Outlooks produced using integrated models tend to produce ambiguous indicators of the importance and ESEE impacts. A benefit/cost with LCP is suggested to arbitrate alternative land use scenarios including improved ROI indicators. ODOT and METRO have integrated models which we believe may be purposed to incorporate benefit/cost analysis routines to address these shortcomings.

The research is to define appropriate ROI measure(s), research how a consumer surplus measure can be obtained from an operational integrated land use and transportation model, apply these new benefit/cost measures to an LCP framework. The State has interest in least cost planning and has focused its attention on incorporating least cost planning tools with transportation modeling. This proposal seeks to add to that understanding with a pilot project to integrate Metro's land use and transportation model (i.e., MetroScope) to a benefit cost analysis framework which addresses the economy, environment and social/health values as a "triple bottom line" decision support tool.

III. PROPOSED RESEARCH, DEVELOPMENT, OR TECHNICAL TRANSFER ACTIVITY

The research proposal is to develop a framework for evaluating user benefits and costs from a land use perspective that can be “plugged” into existing multi-criterion approaches being developed in the State. The focus in this research is to produce an objective analytical framework that employs a consumer surplus approach for analyzing land use scenarios on a return on investment basis.

Key elements of this research will be to:

- develop a means of producing a consumer surplus estimate from scenario alternatives from an integrated land use and transportation model development scenario(s);
- using that consumer surplus measure to generate an impartial indicator for benefit/cost analysis of land use scenarios
- calculating the ROI measure based on benefit/cost of scenario and ranking alternatives based on ROI
- incorporating the new benefit/cost measures with other elements of the Multi-Objective Decision Analysis (MODA) of the Mosaic project

IV. POTENTIAL BENEFITS

Integrated modeling has been proven to be a useful and necessary analysis approach for transportation and land use decision making. ODOT and METRO have employed integrated land use and transportation models for making policy decisions and as well as developing land use forecasts that feed into transportation planning and project development. There is significant benefit to the State by boosting the economic growth of the State by incorporating ROI measures that improve the livability of communities and increases access to economic opportunities by state residents.

V. IMPLEMENTATION

This research project will produce research working papers, software code and documentation that identify and derive appropriate consumer surplus estimates for integrated models, describe the applications of such measure in benefit and cost evaluation of land use scenarios and the integration with the Least Cost Planning methodology. Least cost planning approach would be utilized with ODOT’s integrated land use and transportation model to inform policy makers of the benefit/cost and ROI estimates from alternative land use plans and transportation investment scenarios. TPAU would be the likely organization that would apply the least cost planning approach.

VI. LIST OF REFERENCES *(optional)*

[List the references you identified when you searched for completed and current research.]

CH2MHill, 2014. Mosaic User Guide, Oregon DOT

VII. CONTACT INFORMATION

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