

Least Cost Planning in Transportation: Synthesis

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Transportation Synthesis Reports (TSRs) are brief summaries of currently available information on topics of interest to WSDOT staff. Online and print sources may include newspaper and periodical articles, NCHRP and other TRB programs, AASHTO, the research and practices of other state DOTs and related academic and industry research. Internet hyperlinks in the TSRs are active at the time of publication, but host server changes can make them obsolete.

Request for Synthesis

This Synthesis and Executive Summary of Least Cost Planning approaches across State Department of Transportation agencies across the country, requested by Brian Smith, Director, Strategic Planning Division, WSDOT.

Databases Searched

- TRID - A Transportation Research Database at the Transportation Research Board (TRB)
- Research in Progress (RiP) – A Database of Current Transportation Research at TRB
- Previous Synthesis Reports on WSDOT Research Website
- Google
- Wisconsin DOT Transportation Synthesis Reports
- Federal Transit Administration (FTA) website
- Federal Highway Administration (FHWA) website
- International Transportation and other Research Websites

State, Regional, and Local Agency Least Cost Planning Sources

Oregon Least Cost Planning Comparison Process

PPP Slide Presentation at STIP Stakeholder Committee Meeting; ODOT; November 8, 2011

Outlines the different Least Cost Planning Comparison Processes

What is a comparison process?

- Three different methods
 - Cost-benefit analysis with non-monetized indicators (Example: PSRC)
 - Cost-benefit analysis with multi-objective decision analysis (Example: Sellwood Bridge)
 - Statewide data for weighting

- Addressing risk and uncertainty
- Recommendations

<http://www.oregon.gov/ODOT/TD/TP/docs/LCP/CompProc.pdf>

PSRC: Transportation 2040: Frequently Asked Questions

Puget Sound Regional Council; PSRC; Seattle, WA; May 2010

What is the purpose of Transportation 2040?

The purpose of Transportation 2040 is to support and implement VISION 2040 and the Regional Economic Strategy. The plan represents a major step forward in providing the mobility required to support a growing population to the year 2040, sustainably address the region’s environmental, economic, transportation, safety and overall quality of life objectives.

The plan is a framework that guides future regional decisions, presents the region’s vision to federal and state policy-makers, and paves the way for the implementation of key regional projects and programs.

The plan is intended to be strategic and flexible in order to respond to evolving local, regional, state and national policies and priorities. What big issues is the plan taking on?

VISION 2040 Integration: For the first time, the region’s transportation plan is fully integrated with the region’s long range multicounty growth management policies and its regional economic strategy through the year 2040. . .

<http://psrc.org/assets/3175/FAQs.pdf>

VTrans2035 Final Report: Virginia’s Long-Range Multimodal Transportation Plan

Prepared by: Office of Intermodal Planning and Investment; VTrans2035: Virginia’s Long-Range Multimodal Transportation Plan; Report to the Governor and General Assembly; Prepared for: Commonwealth Transportation Board; VDOT Website; January 2010

. . . Stewards of Assets

How Virginia is doing in terms of transportation can be identified by reviewing current assets, noted in the *VTrans2035 Transportation in Virginia Report*, and performance, identified in the *Transportation Performance Report – 2007*. Both reports, as well as the recently released *Transportation Performance Report – 2008*, are available on the OIPI’s website (www.vtrans.org).

http://vtrans.org/resources/VTrans_2035_Report.pdf

Governor’s Multimodal Strategic Plan: December, 2010

Virginia Department of Transportation; VDOT Website; December 2010

The Multimodal Strategic Plan connects the vision for multimodal transportation to the actions, policies and programs of the Transportation Secretariat and its agencies.

www.vtrans.org

http://www.vtrans.org/resources/Strategic_Plan_Presentation_120110_final_draft.pdf

Code of Virginia: § 33.1-23.03. Board to develop and update Statewide Transportation Plan

Commonwealth of Virginia; Code of Virginia

Code . . . the statewide transportation plan must have “quantifiable measures and achievable goals” relating to several topics. These topics mentioned in the Code include “...safety.... job-to-housing ratios, job and housing access to transit and pedestrian facilities, air quality...” Additionally, that section of the

Code states that the Commonwealth Transportation Board (CTB) shall consider these goals in selecting projects.

Code citation: <http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+33.1-23.03>

Virginia Surface Transportation Plan

Virginia DOT; VDOT Website; January 2012

The VSTP will be used as a guiding document that identifies multimodal solutions. As Virginia seeks to address specific transportation problems, the recommendations identified in the following chapter offer a range of solutions for consideration. Many alternative solutions are recommended in this plan, such as employing Intelligent Transportation Systems (ITS) and Transportation Demand Management (TDM) strategies to improve the efficiency of existing infrastructure. VDOT and DRPT will use these recommendations to pursue the development of a fully integrated analysis that demonstrates the benefits of multiple modes working together in a coordinated solution. This will require significant effort and will be a goal that the transportation agencies of the Commonwealth continue to work toward. It is anticipated that this analysis will be completed for inclusion in the next update of the Virginia Surface Transportation Plan. Likewise, creating a link between transportation and land use can also help increase the mobility of Virginia residents. For example, development patterns can directly influence future transportation needs as follows:

- DENSITY: Increased development density increases the need for transit and promotes mixed use development.
- MIXED-USE: Multiple land use types in the same area can reduce vehicle trips by containing a trip's origin and destination in the same site, and by promoting walking and/or biking.
- DESIGN: Development design that accommodates walking, biking and transit also serve to reduce vehicle trips.

These concepts comprise the elements of both smart growth and transit oriented design. Broader elements of site and community design, such as greenways and street networking can also contribute to reduced vehicle travel, reduced congestion on main roads, and improve the mobility and quality of life for Virginia's residents. The planning and construction of new highways, implementation and expansion of public transportation systems, and other transportation improvements affect existing land uses and plans for future development. The type and pattern of development influence travel patterns, and influence demand for transportation facilities. In Virginia, land use is regulated by local governments, while transportation planning and funding decisions are generally made at the state level.

Improving the coordination between transportation and land use planning is essential for ensuring mobility throughout the Commonwealth. VDOT and DRPT are both committed to working closely with local governments and stakeholders to improve the coordination between transportation and land use in Virginia.

"VTrans2035" is this statewide plan and that report

(http://vtrans.org/resources/VTrans_2035_Report.pdf) references Code section 33.1-23.03

[http://www.virginiadot.org/Projects/vtransNew/resources/VSTP_%20by Chapter/Chap1_2035VSTP.pdf](http://www.virginiadot.org/Projects/vtransNew/resources/VSTP_%20by%20Chapter/Chap1_2035VSTP.pdf)

Other Related Sources

Least-Cost Planning for 21st Century Electricity Supply: Meeting the Challenges of Complexity and Ambiguity in Decision Making

Mark Cooper, Senior Fellow for Economic Analysis, Institute for Energy and the Environment, Vermont Law School; June 2011

Executive Summary

The Increasingly Complex Challenge of Resource Acquisition

Energy policy and regulatory decision making in the American electricity sector have always been a challenge because the U. S. is among the most electricity intensive of all nations and it has an extremely wide set of resources with which to meet its electricity needs. Moreover, in the past quarter of a century a fierce debate about the existence and response to climate change, a roller coaster ride in fossil fuel prices and a fizzled “nuclear renaissance” have made things much more difficult by casting doubt on the three primary fuels on which the U.S. relies for almost 90 percent of its electricity. In spite of this uncertainty, because electricity is an essential building block of modern life, decision makers are under constant real-time pressures to ensure electricity supply at affordable prices.

This paper argues that the insights and recommendations from the study of financial portfolio and real option analysis, technology risk assessment, reliability and risk mitigation management, and Black Swan Theory all indicate that the 20th century approach to resource acquisition in the electric utility industry is ill-suited to the 21st century economic environment. Indeed, it can be argued that the approaches taken in a wide range of regulatory proceedings such as integrated resource planning, purchase power agreement reviews and general rate cases may have been rendered obsolete by a dramatic change in the terrain of decision making.

<http://www.vermontlaw.edu/Documents/21st%20Century%20Least%20Cost%20Planning.pdf>

Least Cost Planning in Puget Sound Regional Transportation Plans has been examined by the Transportation Policy Board of the PSRC Metropolitan Planning Organization

John Niles; Public Interest Transportation Forum; Better Transport; 2010

Here is the history of what happened in metropolitan Seattle in 2000-2001 on Least Cost Planning

In 2004 Sound Transit critics reopened the long-standing call for the evaluation of transportation alternatives by Puget Sound Regional Council (PSRC) according to the Least-Cost Planning (LCP) methodology required by Washington State law. On June 24, 2004, the chair of the Transportation Policy Board of the PSRC announced that she would take up this question in future meetings of the Board.

Almost six years later, the PSRC Transportation 2040 Metropolitan Transportation Plan released in draft form on January 22, 2010 includes a description of the benefit-cost analysis tool that eventually resulted from PSRC's response to the LCP mandate.

<http://www.bettertransport.info/pitf/leastcostplanning.htm>

Public Transportation: Benefits for the 21st Century

American Public Transit Association; APTA Website; 2007

This fact-filled report provides an overview of the benefits that public transportation brings to individuals, communities and our nation as a whole.

Public transit's broad reach extends to all of America's communities, large and small, as it helps revitalize business districts, allows employers to tap into larger workforces, builds economic revenues and increases property values.

On the national level, public transportation supports our nation's goals and policies, including reducing our dependence on foreign oil, and providing critical response in emergencies. On an individual level, public transportation saves money, and provides people with choices, freedom and opportunities. . . http://www.apta.com/resources/reportsandpublications/Documents/twenty_first_century.pdf

Least Cost, Greatest Impact: a discussion paper on the applicability of Least Cost Planning to transport in Australia DRAFT

Authors: Doreen Chen, Sally Campbell & Stuart White; Institute for Sustainable Futures, University of Technology, Sydney, AU; October, 2003

Least Cost Planning (LCP) is a methodology that considers the full effect of planning alternatives on different interests, including consumers, the community, business and industry, the environment, and government (Victoria Transport Policy Institute, 2003). It aims to evaluate a range of planning options, and to determine which options reduce total costs and maximize total benefits *across* those interests and has been applied widely in various utility sectors such as energy and water. In a transport context, LCP is able to enhance the efficiency, equity, transparency, and consistency of transport decision-making, providing relevant data that encourages the formulation of improved transport solutions. <http://www.isf.uts.edu.au/publications/chenetal2003leastcost.pdf>

Washington State RCW 47.80.030

Washington State Legislature; RCW 47.80.030; Regional Transportation; 2000

Regional transportation plan — Contents, review, use.

(1) Each regional transportation planning organization shall develop in cooperation with the department of transportation, providers of public transportation and high capacity transportation, ports, and local governments within the region, adopt, and periodically update a regional transportation plan that:

(a) Is based on a least cost planning methodology that identifies the most cost-effective facilities, services, and programs. . .

In the State of Washington, beginning July 1, 2000, all regional transportation plans developed by Regional Transportation Planning Organizations in Washington State are required (RCW 47.80.030) to be “based on a least-cost planning methodology that identifies the most cost effective facilities, services, and programs”. Within Washington Administrative Code (WAC 468-86-030 and WAC 468 -86-080) least-cost planning is defined as “a process of comparing direct and indirect costs of demand and supply options to meet transportation goals and/or policies where the intent of the process is to identify the most cost-effective mix of options.”

<http://apps.leg.wa.gov/rcw/default.aspx?cite=47.80.030>

The 2001 Least-Cost Planning Analysis

Puget Sound Regional Council; Supplemental Technical Appendix 11; Metropolitan Transportation Plan Alternatives Analysis and Draft Environmental Impact Statement, Volume 2 – Appendices; October 26, 2000

Summary

What is Least-Cost Planning?

In the State of Washington, beginning July 1, 2000, all regional transportation plans developed by Regional Transportation Planning Organizations in Washington State are required (RCW 47.80.030) to be “based on a least-cost planning methodology that identifies the most cost effective facilities, services, and programs”. Within Washington Administrative Code (WAC 468-86-030 and WAC 468 -86-080) least-

cost planning is defined as “a process of comparing direct and indirect costs of demand and supply options to meet transportation goals and/or policies where the intent of the process is to identify the most cost-effective mix of options.” Least-cost planning attempts to consider all of the resource costs associated with alternative investments, and to provide information relevant to decisions about investment selection and prioritization. Least-cost planning combines elements of strategic, systems level planning with the accounting framework of benefit-cost analysis. This document describes the application of least-cost analysis to the system level transportation alternatives contained in the *Metropolitan Transportation Plan Alternatives Analysis and Draft Environmental Impact Statement* released August 31, 2000.

http://psrc.org/assets/3141/mtp_deis_vol2leastcost.pdf

A Critical Comparison of Planning Methods for Metropolitan Transportation Decision-making

Dick Nelson and Don Shakow; Integrated Transportation Research, Seattle, WA; Submitted for presentation at: Transportation Research Board, 76th Annual Meeting, January 12-16, 1997; Washington, D.C.; Better Transport; 1997

Abstract

A search for congestion mitigation strategies for metropolitan regions based on economic criteria does not require an estimate of the total social benefits derived from the transportation infrastructure. The assumption that societal benefits are constant is adequate for sketch planning exercises designed to identify cost-effective strategies that address urban congestion and its environmental impacts. Least-cost transportation planning, as it has been derived from energy sector models, is therefore a more practical real-world regional transportation planning methodology than is traditional benefit-cost analysis.

<http://www.bettertransport.info/lcp/nelson12.htm>

Sustainable Transportation through an Integrated Planning Process

Dick Nelson, Don Shakow, Integrated Transportation Research, Seattle, Washington; Submitted for publication in the Proceedings of the OCED Conference: Toward Sustainable Transportation, Vancouver, B.C., Canada; March 24-27, 1996

Summary

This paper outlines a new approach to metropolitan region transport planning and to regional transport policy and investment decisions that supports the goal of sustainable transport. The method has been designed to assist planners in developing least-cost strategies to address congestion and declining air quality, the most critical transport-related problems in many metropolitan areas in the U.S.A. However, it could be adapted to meet the different needs of other metropolitan regions. The method is both practical and systematic, relying on a new sketch planning model to calculate costs and benefits. It is termed an integrated approach because it puts demand-side and efficiency alternatives on the table for consideration along with traditional supply-side alternatives. A preliminary real-world application of the method has been made in the central Puget Sound region of Washington State, and a strategy for cost-effective transport investments in the region has been recommended. That strategy is referred to in this paper for purposes of example.

<http://www.bettertransport.info/lcp/nel3.htm>

Integrated Transportation Planning-Applying Least-Cost Planning Methods to Transportation System Analysis: A Primer for Policymakers

Puget Sound Regional Council, Seattle, WA; Bettertransport.info; June 1995

This report describes how Integrated Transportation Planning and the use of least-cost methods of analysis may help in developing cost-effective transportation facility investment decisions.

<http://www.bettertransport.info/lcp/LCP-PSRCprimer.pdf>

Least-Cost Planning: A Tool for Metropolitan Decision-Making

Dick Nelson and Don Shakow; Transportation Research Record, Report #1499, National Academy of Sciences/Engineering, Washington, D.C.; 1995

Abstract

This paper describes a new approach to transportation investment planning and a prototype computer model. The model was developed to assist metropolitan transportation planners and decision makers in meeting the new federal and state planning requirements. Based on two decades of experience in electrical energy planning, the model incorporates the principles of least cost planning and full cost accounting. It attempts to promote an efficient search for investment and policy options that enhance regional benefits, while reducing social costs.

An application of the model for the Puget Sound metropolitan region was carried out by comparing a limited number of options. These include a set of study options associated with a proposed light rail system; two commuter rail options; an option featuring the construction of an ambitious bicycle and pedestrian network; a highway construction option; and a series of options emphasizing public and private incentives directed toward reduced single occupancy vehicle use. Our analysis suggests that a well-coordinated set of demand management measures in conjunction with modest investment in infrastructure may be cost-effective relative to major construction projects.

<http://www.bettertransport.info/lcp/nel4.htm>

A Cost-Effective Strategy for Puget Sound Transportation: If We Spend Billions on Regional Transportation, Shouldn't We Expect a Good Return on Our Investment?

Dick Nelson and Don Shakow, Least Cost Transportation Planning Project; Summary Presented to the Central Puget Sound Regional Transit Authority, Institute for Washington's Future, September, 1995

Summary

One: Provide a high-capacity alternative to driving alone

--Complete a "seamless" regional HOV lane network

--Provide frequent express bus service utilizing the HOV lanes

Two: Use incentives to convert commuters from SOV to HOV

--Expand Commute Trip Reduction Law to more work sites; offer employer tax credits

--"Cash out" employer subsidized parking

--Provide a guaranteed ride home to HOV commuters

--Improve the regional ride-matching service

--Reduce the user cost of vanpooling to the equivalent of transit

Three: Experiment with innovative ways to reduce vehicle use

--Site public offices and subsidized housing on transit routes and near employment

--Initiate a shared-ride parataxi system; demonstrate "instant ridesharing"

--Demonstrate intensive bicycle commuting

Four: Broaden governance from transit to transportation

--Create a regional transportation agency that can plan and implement, together with other transportation entities, a diverse and integrated package of measures

--Benefits: Congestion relief, less environmental impact, more travel choices, and more dollars for local transportation problems

Background

The Least Cost Transportation Planning Project was initiated in 1993 under the aegis of the Institute for Transportation and the Environment. The purpose of this three-phase project was to conceive new ways of thinking about the transportation dilemma facing the central Puget Sound region, and to develop new planning tools that could be applied to find the most cost-effective solution.

In the first phase of the effort, a conceptual methodology was developed, and a list of potentially feasible transportation options was compiled. The second phase resulted in the development of a prototype least-cost/full-cost planning model, and its preliminary application to several regional proposals, including the Regional Transit Authority rail system that was defeated at the March 1995 ballot. Two reports detailing the methodology and model have been issued, and a summary technical paper will be published by the Transportation Research Board of the National Academy of Sciences. A report summarizing the economic analysis of the RTA proposal was released prior to the election. The project has continued in a third phase under the aegis of the Institute for Washington's Future. The purpose of the last phase of the work is to develop a regional transportation strategy that can meet a cost-effectiveness test.

<http://www.bettertransport.info/lcp/nel1.htm>

Development of the Conceptual Model for a Least Cost Transportation Planning Process

Phase I Report - February 1994

Dick Nelson and Don Shakow, The Institute for Transportation and the Environment; Phase I report, (Executive Summary and Table of Contents only - with ordering instructions); February, 1994

Least cost planning: A comprehensive, technically consistent planning method that provides an economic framework to assess the cost-effectiveness of all transportation modes and management strategies, while taking into account all societal costs.

Executive Summary

This report presents the results of the first phase of a two-part least cost planning transportation study. The study was undertaken in response to a request by Washington State Department of Transportation Secretary Sid Morrison to suggest how least cost planning concepts might be applied to the work of the Central Puget Sound Regional Transit Authority (RTA).

The first phase has produced the conceptual design and logic for a computer model that incorporates the principles of least cost planning and an extensive list of transportation options for the region. The second phase will allow the model to be calibrated and applied to alternative transportation portfolios. Least cost planning, which has been successfully used in electrical power planning in the Pacific Northwest, is a tool that can be employed to help solve the difficult and complex transportation problems facing the central Puget Sound region. Least cost planning aims to develop transportation plans that are socially optimal. It achieves this objective by searching every feasible alternative, those that limit demand as well as those that increase capacity. Current planning practices, by contrast, search within a narrow range of possibilities and achieve results that are not truly optimal.

<http://www.bettertransport.info/lcp/nel6.htm>

Development of a Prototype Least-Cost Planning Model and Its Initial Application to the Puget Sound Region

Dick Nelson and Don Shakow, the Institute for Transportation and the Environment; Better Transport; Phase II report, December, 1994 (Executive Summary and Table of Contents only - with ordering instructions) Phase II Report; December 1994

Least Cost planning: A comprehensive, technically consistent planning method that provides an economic framework to assess the cost-effectiveness of all transportation modes and management strategies, while taking into account all societal costs.

Executive Summary

A least cost transportation planning model is being developed and applied to metropolitan transportation decision making in the central Puget Sound region.

The prototype model, which runs in a personal computer, weighs the benefits and costs of a large number of transportation options. Options range from those which increase transportation supply to those which manage travel demand. The model compares the costs to implement an option to the option's effect on the baseline cost of the surface transportation system over a 30 year planning period. The baseline cost is calculated by accounting for all direct and indirect costs of travel, including time costs and environmental costs. Implementation costs include the costs of construction, operation, and maintenance in the case of supply options, and the costs of incentives and administration in the case of demand options.

Benefits are produced if an option reduces the baseline costs of the transportation system. For example, a transit option which attracts new riders is credited with benefits proportional to the number of single occupant vehicles reduced. Each SOV driver who becomes a transit rider reduces his or her travel costs, and may, depending on the transit mode, reduce congestion costs. Other benefits are realized if an option reduces the environmental costs of SOV travel. Walking and biking obviously will generate benefits in this category.

The model calculates the net social benefit of each option measured in dollars. Future dollars are discounted to take into account the higher value of present investments. Eventually the model will be refined to allow the selection of least cost portfolios, thereby providing a way to find the optimum set of transportation alternatives among a large number of investment opportunities.

The least cost planning model has been used to analyze 18 options under active consideration or discussion in the region. These include: the Regional Transit Project's rapid rail alternative developed several years ago and now superseded by light rail options, three of which are included in the list, two commuter rail proposals, a major bikeway investment, a traveler information system, HOV lane completion, and several incentives to encourage SOV drivers to use other modes or telecommute.

<http://www.bettertransport.info/lcp/nel5.htm>

Published Literature

Integrated Resource Planning for Transport: Asking Better Questions

Monograph Title: Urban Transport XI: Urban Transport and the Environment in the 21st Century
Authors: Campbell, S and White, S; WIT Press, Ashurst Lodge, Ashurst, Southampton, UK; Editors: Brebbia, C A; Wadhwa, L C; Urban Transport 2005 Conference, 12 - 14 April 2005, Algarve, Portugal; 2005

Abstract

Current transport planning methods do not deliver accessibility in a sustainable way—a phenomenon illustrated by the dominance of road construction as a means to provide access in cities. This research proposes a comprehensive evaluation methodology for investment decisions aimed at improving urban accessibility—Integrated Resource Planning (IRP) for transport. Using IRP in transport planning means agreeing on a metric for improved accessibility in a location and then developing a range of ‘options’ to meet this need. Each ‘option’ is evaluated in terms of cost per unit of improved accessibility. This paper proposes that cost effective decisions will only arise from comparison of the full range of options using a consistent methodology.

Find a library where document is available

Order URL: <http://worldcat.org/isbn/184564008X>

<http://www.isf.uts.edu.au/publications/campbellwhite2005integratedtransport.pdf>

Energy and Environmental Implications of Nox Emission Reduction from the Transport Sector of Beijing: A Least-Cost Planning Analysis

Authors: Shrestha, R M; Anandarajah, G; Adhikari, S; Jiang, K; Songli, Z; Corporate Authors: Elsevier, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, United Kingdom; 2005

Abstract

In this study, a long-term least cost vehicular mix model is used to determine cost-effective passenger transport technology and energy options at selected targets for nitrogen oxides emission reduction from the transport sector in Beijing, China, during 2005-2020. The study also examines the implications of the nitrogen oxides emission reduction targets (NERTs) for greenhouse gas and other local pollutant emissions. A key finding of this study is that liquefied petroleum gas buses would replace diesel buses in Beijing at NERT of 10% while the shares of other transport options would remain unaffected. At higher NERT of 20-50%, hybrid cars and electric trolley buses would be cost effective. Total energy requirement would not change much at lower values of NERT. However, it would decrease as the emission target is set at 20% or higher. Results also show that total cost would increase only marginally (by less than 0.1%) up to the emission reduction target of 10% while it would increase by as high as 31.7% when the target is increased to 50%.

Record URL: <http://www.sciencedirect.com/science/a...Y8V-1/1/46164fbf01decc9b9af0067298ecdba0>

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Order URL: <http://worldcat.org/issn/13619209>

Serial URL: <http://www.sciencedirect.com/science/journal/13619209>

Applying Least Cost Planning Principles to a Rural Regional Transportation Plan

Authors: Schutz, J B; Corporate Authors: Institute of Transportation Engineers, 1099 14th Street, NW, Washington, DC 20005-3438 USA; 2003; Conference: Institute of Transportation Engineers 2003 Annual Meeting and Exhibit (held in conjunction with ITE District 6 Annual Meeting), Location: Seattle, WA; 2003

Abstract

This paper describes how legislation in the state of Washington requires that Regional Transportation Plans (RTPs) incorporate a "least cost planning" methodology into updates of those plans after December 31, 1999. The Washington State Department of Transportation (WSDOT) was responsible for providing guidelines on this methodology, one for urban regional transportation planning organizations (RTPOs) and one for rural RTPOs. The Island County Sub-Regional Transportation Plan was chosen as the

pilot project for developing the rural methodology. Least cost planning had been around in the energy field for some time, but had only been introduced to the transportation field on a theoretical basis at that time. Least-Cost Planning: Principles, Applications, and Issues² were selected as the guide for developing the project. This research did not actually provide a methodology, but discussed the concepts of least cost planning within the framework of transportation planning methods. Six principles were identified and became the basis for the study, and these principles are: (1) an emphasis on developing system-level plans, (e.g. regional or MPO level plans) to explore policies that can only be fully evaluated at that level; (2) consideration of all alternatives, including demand management approaches; (3) explicit accounting for uncertainty in the estimation of benefits and costs; (4) public involvement in the decision-making process; (5) coordination among jurisdictions; and (6) monitoring and updating plans to reflect new information about demand for different facilities and the cost-effectiveness of different approaches. This paper describes how those principles were applied to the Island County Sub-RTP, what constraints exist to applying the methodology, and the advantages of using least cost planning.

Supplemental Notes: Full conference proceedings available on CD-ROM.

Availability: Institute of Transportation Engineers (ITE), 1099 14th Street, NW, Washington, DC 20005-3438 USA, 2003

Recommend Value of Time for Passenger Transport

(Foreign Title: Anbefalte Tidsverdier I PersonTransport; Language: Norwegian); Authors: Killi, M
Corporate Authors: Norwegian Institute of Transport Economics, Gransesvingen 7, P.O. Box 6110, Etterstad, Oslo N-0602 Norway; 1999

Abstract

A comprehensive set of values of time for multimodal cost benefit analysis and for comparison of projects across models has been lacking. The values of time for passenger transport proposed are mainly based on the Norwegian Value of Time Study, TOI report 379/1997 and the follow-up report, TOI report 406/1998. The proposed values differ between long and short trips and between modes. The modes for long trips are car, train, bus, air and ferry. The modes for short trips are car and public transit. The values of time are further divided by three travel purposes: business trips, commuting, and private trips.

Availability: National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 USA

Order Number: PB2002-104644, Publication Date: 19991200

Guide to Calculating Transportation Demand Management Benefits

Authors: Litman, T A; Corporate Authors: Victoria Transport Policy Institute, 1250 Rudlin Street, Victoria, British Columbia, V8V 3R7 Canada

Abstract

This guide provides instructions for estimating the benefits of transportation demand management (TDM) programs, including commute trip reduction; pricing policies; land use management strategies; and programs to support alternative modes such as transit, ridesharing, bicycling, walking and telecommuting. It describes how to determine the transportation impacts of a TDM program, which may include changes in mode, travel time and route, and reductions in total travel. It provides information on estimating the value of these changes in travel behavior based on current analysis of transportation costs. It discusses how to avoid common problems, such as double counting and offsetting impacts. Examples show how this approach can be applied to calculate benefits of specific TDM programs, and to determine the optimal investments using Least Cost Transportation Planning techniques. Documents, software and organizations useful for TDM planning and evaluation are listed. This guide is useful for

transportation professionals involved in multi-modal planning and policy analysis, and TDM promotion (including transit, rideshare, bicycle, pedestrian and telecommuting programs).

Availability: Victoria Transport Policy Institute, 1250 Rudlin Street, Victoria, British Columbia V8V 3R7 Canada

Least-Cost Transportation Planning in ODOT: Phase 2 – Final Report

Authors: Rufolo, A M; Bronfman, L M; Strathman, J G; Hillsman, E L; Elliot, S R; Corporate Authors: Portland State University, Center for Urban Studies, Portland, OR; Oak Ridge National Laboratory, Center for Transportation Analysis, Energy Division, Oak Ridge, TN; Oregon Department of Transportation; Salem, OR ; Federal Highway Administration; 1999

Abstract

This project is intended to suggest ways in which least-cost planning principles could be incorporated into the transportation planning process. The Mt. Hood corridor was chosen for examination. The examination of the planning process highlighted several differences between a least-cost planning approach and the present process. First, the corridor chosen is designated as an Access Oregon Highway, and this designation sets certain level of service standards that do not appear to be consistent with a least-cost planning process. Second, the analysis of future outcomes was not as detailed as might be required for a least-cost planning process. Third, the process was more deterministic than would be expected with least-cost planning, since the latter emphasizes uncertainty in forecasts and the need for flexibility. Fourth, the range of alternatives considered appeared to be more narrowly defined than one would find with least-cost planning, and fifth, the analysis of travel patterns and possible diversion to other routes was not extensive as might be done for least-cost planning. Many of these constraints were due to specific requirements of the planning process or of the environmental process. Various approaches to evaluating alternatives for the Mt. Hood corridor are detailed and discussed. The types of data needed and the likely cost of the analysis are specified for different approaches. These include cost-benefit analysis, cost-effectiveness or problem-oriented analysis, and estimation of decision-maker preferences. It is concluded that the general concept of Least-Cost Planning is readily adaptable to transportation planning; however, the specific methodology is still not well defined and there are substantial knowledge gaps regarding the effect of various policies. In particular, there is little information on the effectiveness of various non-construction alternatives in responding to increases in demand for transportation services. It appears to be both feasible and desirable to move in the direction that has been identified as Least-Cost Planning, characterized as a planning process that seeks to improve the efficiency of the transportation system, primarily by considering alternatives to new construction as methods to provide transportation services. Demand management systems, pricing systems, and land use systems are among the options that should be evaluated along with road construction, transit construction, and other supply oriented management systems.

Record URL: http://www.oregon.gov/ODOT/TD/TP_RES/docs/Reports/LeastCostTransPhase2.pdf

Least-Cost Planning: Principles, Applications and Issues

Corporate Authors: ECONorthwest, Eugene, OR; Parsons, Brinckerhoff, Quade and Douglas, Inc., Portland, OR; Federal Highway Administration, Office of Environment and Planning, Washington, DC; 1995

Abstract

This report summarizes existing research that relates to how public entities making transportation investment decisions can attempt to identify, quantify, value, and sum the benefits and costs of alternative transportation programs and projects. The report looks at an emerging transportation

planning concept called "least-cost planning". Least-cost planning embodies both a planning process and specific analytical techniques. It attempts to meet a given set of transportation objectives with a combination of improvements, policies, and programs that is less expensive than any other combination. For planners at state departments of transportation or Metropolitan Planning Organizations (MPOs), this report provides a general framework (both planning concepts and analytical techniques) for evaluating transportation projects, and ideas on how to shift from current practices toward the type of analysis recommended.

Supplemental Notes: This report is one of a series of reports issued periodically by the FHWA's Office of Environment and Planning, Metropolitan Planning Division. It was prepared under contract to COMSIS Corporation.

Availability: Federal Highway Administration, Office of Environment and Planning, Washington, DC.

Least-Cost Planning Implementation

Authors: Ulberg, C; Yeager, J M; Hansen, M; Corporate Authors: Transportation Research Board Washington, DC; Washington State Department of Transportation; Olympia, WA; 1995; Conference: Fifth National Conference on Transportation Planning Methods Applications-Volume II: A Compendium of Papers Based on a Conference, Seattle, Washington, April 1995; Location: Seattle, Washington ; Sponsors: TRB and WSDOT; 1995

Abstract

Recent legislation in Washington State has mandated the use of least-cost planning methods in developing regional transportation plans. Least-cost planning, however, was not defined in the legislation. Consequently, the purpose of this paper is to define and fill this information gap. The objectives of this paper--which appears in a compendium of conference papers--is to: describe alternative ways to conceive of least-cost planning, portray the current planning process, indicate points at which current practices incorporate elements of least-cost planning, identify the gaps between the current practices and least-cost planning, describe what needs to be done to allow planning organizations to engage in least-cost planning, and present an approach that the state can use in assisting planning organizations in implementing the legislation. Extensive interviews were conducted with planners and officials conversant in least-cost planning.

Availability: Jerry M. Faris, 4106 Tralee Road, Tallahassee, FL 32308

Least Cost Transportation Planning in Washington State

Authors: Filkins, R; Corporate Authors: Transportation Research Board, Washington, DC; Washington State Department of Transportation, Olympia, WA; 1995; Conference: Fifth National Conference on Transportation Planning Methods Applications-Volume I. A Compendium of Papers Based on a Conference Held in Seattle, Washington in April 1995, Seattle, WA, 1995

Abstract

Least cost planning, which was developed for use in the utilities industry, is being implemented by the Washington State Legislature. Least cost planning for transportation is a process of comparing direct and indirect costs of demand and supply options to meet transportation goals and/or policies where the intent of the process is to identify the most cost effective mix of options. This paper, which appears in a compendium of conference papers, describes the history of least cost planning, explains the Washington State Department of Transportation's role in the process, and reports on a study on implementation of least cost planning. Formal guidelines on implementation are expected.

Supplemental Notes: Additional support was provided by the Puget Sound Regional Council and King County, Washington.

Availability: Jerry M. Faris, 4106 Tralee Road, Tallahassee, FL 32308

Least-Cost Transportation Planning in ODOT: Feasibility Report

Authors: Rufolo, A M; Bronfman, L M; Strathman, J G; Corporate Authors: Portland State University Center for Urban Studies, Portland, OR; Oregon Department of Transportation; Salem, OR; Federal Highway Administration, Washington, DC; 1995

Abstract

Least-Cost Planning or Integrated Resource Planning is used in the electric utility industry to broaden the scope of choices to meet service requirements. This typically includes methods to reduce the demands for electricity as well as the more traditional electric generation options. Techniques have been developed to compare the cost of electricity generation with the cost of meeting service requirements by reducing electrical usage. In addition to cost considerations, utilities typically take account of uncertainty associated with forecasts and a variety of other considerations in specifying their least-cost plan. The basic economic rationale, that users pay a price less than the cost of providing additional service, is the same between the utilities and transportation. However, there are also fundamental differences. Consumers are more concerned about the nature of the service for transportation, the use of the transportation system is affected by the quality of service provided, transportation modes have system or network relations that make it harder to treat sections in isolation, and transportation funding levels determine the amount of service to be provided. Least-cost principles hold promise to improve transportation planning; the techniques used in the utility industry cannot be directly transferred to transportation.

Availability: National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 USA

Least-Cost Planning: A Tool for Metropolitan Transportation Decision Making

Authors: Nelson, D; Shakow, D; Corporate Authors: Transportation Research Board, Washington, DC; 1995

Abstract

A new approach to transportation investment planning and a prototype sketch-planning model are described. The model was developed to assist metropolitan transportation planners and decision makers in meeting the new federal and state planning requirements. Based on two decades of experience in electrical energy planning, the model incorporates the principles of least-cost planning and full-cost accounting. It attempts to promote an efficient search for investment and policy strategies that enhance regional benefits, while reducing social costs. A demonstration of the model for the Puget Sound metropolitan region was carried out by comparing a limited number of options. These included a set of study options associated with a proposed light rail system, two commuter rail options, an option featuring the construction of a regional bicycle network, a highway expansion option, and a series of options emphasizing public and private incentives directed toward reduced single-occupancy vehicle use. Further refinements of the model will allow for the accounting of synergy among options, the comparison of decision packages, and the selection of an optimal and integrated set of investments and policies.

Supplemental Notes: This paper appears in Transportation Research Record No. 1499, Transportation Planning, Management Systems, Public Participation, and Land Use Modeling.

Availability: Transportation Research Board Business Office, 500 Fifth Street, NW, Washington, DC 20001

Find a library where document is available

Order URL: <http://worldcat.org/isbn/030906158X>

Applying Electrical Utility Least-Cost Approach to Transportation

Authors: McCoy, G A; Growdon, K; Lagerberg, B; Corporate Authors: Washington State Energy Office
Olympia, WA; 1994

Abstract

Members of the energy and environmental communities believe that parallels exist between electrical utility least-cost planning and transportation planning. In particular, the Washington State Energy Strategy Committee believes that an integrated and comprehensive transportation planning process should be developed to fairly evaluate the costs of both demand-side and supply-side transportation options, establish competition between different travel modes, and select the mix of options designed to meet system goals at the lowest cost to society. Comparisons between travel modes are also required under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). ISTEA calls for the development of procedures to compare demand management against infrastructure investment solutions and requires the consideration of efficiency, socioeconomic and environmental factors in the evaluation process. Several of the techniques and approaches used in energy least-cost planning and utility peak demand management can be incorporated into a least-cost transportation planning methodology. The concepts of avoided plants, expressing avoidable costs in levelized nominal dollars to compare projects with different on-line dates and service lives, the supply curve, and the resource stack can be directly adapted from the energy sector.

Availability: National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 USA
Order Number: DE96012774WTS

Applying Least Cost Planning to Puget Sound Regional Transportation: Phase II Report: Development of a Prototype Least Cost Planning Model and Its Initial Application to the Puget Sound Region

Authors: Nelson, D; Shakow, D; Corporate Authors: Institute for Transportation and the Environment
Seattle, WA; 1994

Abstract

This is the second report presenting the results of a least cost transportation planning study. The objectives of the study were: (1) To create a prototype least cost transportation decision-support tool in the form of a computer model that allows comparison of the full social costs and benefits of alternative transportation investment packages; and (2) To employ the model to analyze regional rail options proposed by the Central Puget Sound Regional Transit Authority and non-rail alternatives. The alternatives include policies to raise the cost of single occupancy vehicle use as well as other transportation demand management strategies. The study has been undertaken in two phases. Phase I involved the conceptual design of a computer model incorporating the principles of least cost planning and full cost accounting. A report describing the model and appending an extensive list of transportation options for the region was issued in February 1994 (Phase I Report, see TRIS 667348). In Phase II, the model has been brought to the prototype stage in its development, and its application has been simulated through the analysis of a diverse set of supply and demand-side transportation options. Although this report describes the basic framework of the model, its focus is on model development tasks that were implemented in Phase II and the results of initial model simulations.

Availability: Institute for Transportation and the Environment, 85 East Roanoke Street, Seattle, WA 98102

Applying Least Cost Planning to Puget Sound Regional Transportation: Phase I Report

Authors: Nelson, D; Shakow, D; Corporate Authors: Institute for Transportation and the Environment,
Seattle, WA; 1994

Abstract

This report presents the results of the first phase of a two-part least cost planning transportation study. The study was undertaken in response to a request by Washington Department of Transportation to suggest how least cost planning concepts might be applied to the work of the Regional Transit Authority (RTA). The first phase has produced the conceptual design and logic for a computer model which incorporates the principles of least cost planning and an extensive list of transportation options for the region. The second phase will allow the model to be calibrated and applied to alternative transportation portfolios. Least cost planning, which has been successfully used in electrical power planning in the Northwest, is a tool that can be employed to help solve the difficult and complex transportation problems facing the central Puget Sound region. Least cost planning aims to develop transportation plans which are socially optimal. It achieves this objective by searching every feasible alternative, those which limit demand as well as those which increase capacity. Current planning practices, by contrast, search within a narrow range of possibilities and achieve results which are not truly optimal. Availability: Institute for Transportation and the Environment, 85 East Roanoke Street, Seattle, WA 98102

Applying a Least Total Cost Approach to Evaluate ITS Alternatives

P. DeCorla-Souza, et al.; "Presented at Annual Meeting of Transportation Research Board; January 1995

Forging Links to Transport System Rationality: A Methodology for Integrated Transport Planning

International Institute for Energy Conservation; Washington, DC; September 1994.

Least Cost Transportation Planning: Lessons from the Northwest Power Planning Council

E. W. Sheets and R.H. Watson; University of Washington, Graduate School of Public Affairs, Seattle, WA; January 1994.

Least-Cost Planning for Transportation? What We Can Learn About Transportation Demand Management from Utility Demand-Side Management

R. L. Steiner; Presented at Annual Meeting of Transportation Research Board, Washington, DC; January 1992.