Tolling White Paper 2

Geographic and Situational Limits

Prepared for the Oregon Department of Transportation

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Tolling and Pricing White Paper #2

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Section 1.0: Introduction and Policy Context: What Is the Purpose of This Paper?

Introduction

Advances in electronic technology enable the tolling of highways to be done in a variety of ways and for a variety of public policy objectives. It is now possible to toll individual freeway lanes in a manner that balances demand using variably priced tolls to meter traffic volumes and insure an unimpeded flow. These advances have improved the efficiency of toll collection and the traffic flow and operation of toll ways.

While efficiencies have been gained on existing toll roads, some tolling applications may only work well in particular circumstances. A new toll road, for example, must be able to provide sufficient time savings to warrant the toll motorists are being asked to pay.

The State of Oregon has a well established transportation planning process that is consistent with federal requirements and coordinated between ODOT, metropolitan planning organizations (MPOs), and local government. Oregon has state statutes as well as policies within the Oregon Transportation Plan (OTP) that refer to tolling and toll ways. The question is now being asked: In what circumstances does tolling make sense?

One purpose of this paper is to assist statewide planning efforts with the relatively new subject of highway tolling/pricing by considering where particular tolling applications are likely to be appropriate, or inappropriate, within Oregon. In other words, are there geographic or situational limits that should guide tolling policy in Oregon?

A second purpose of this paper is a discussion of the financing of toll roads in those cases where tolls are unlikely to be able to fund the full cost of facility construction and maintenance, a very likely circumstance in a sparsely populated state like Oregon. ODOT, as well as other transportation providers in the state, strives to communicate with the public in an open and clear fashion and to meet its commitments with a high degree of reliability. The inherent uncertainty of partially funded toll projects can challenge these objectives.

This paper discusses a range of potential tolling applications, but not every one. Section 3 of this paper details the range of applications included in this paper. Two primary policy objectives for tolling are discussed in this paper: tolling for revenue to finance new construction and tolling as a traffic or congestion management tool.

There are other papers commissioned concurrently as part of this policy process that address additional tolling considerations. Toll managed truck-only lanes are covered in Paper #7. The system-wide application of congestion pricing in urban areas is the topic of Paper #5. Paper #1 considers greenhouse gas emission reduction as a policy objective for tolling. This paper and the other papers in the series are intended to encourage public discussion and comment. Assertions and recommendations included in the document are

those of the authors and do not constitute ODOT policy. Complex problems demand thorough study; this paper is intended to facilitate the consideration of the issues discussed herein.

This paper is divided into six sections, as follows:

- Section 1, Introduction, gives the background and policy context of tolling.
- Section 2, Toll Management Issues, discusses the challenges and issues with building, owning, and operating a toll facility.
- Section 3, Tolling Applications, discusses a proposed narrowing of circumstances and project types under which tolling would be appropriate and includes factors agencies should consider when assessing tolling applications.
- Section 4, Tolling Performance Parameters, provides discussion of more quantitative performance measures agencies could consider when evaluating the applicability of tolling for a project.
- Section 5, Consideration of Tolling in the STIP Process, provides a discussion about ways to incorporate the consideration of tolling into the Statewide Transportation Improvement Program (STIP) process, including situations where tolling does not cover the entire construction cost of a project.
- Section 6, Conclusions and Preliminary Recommendations, summarizes the paper's findings and conclusions, and provides some considerations for public discussion for expanding the Oregon Transportation Plan's tolling policies.

Background

Oregon has a limited history of tolling. Facilities such as the I-5 Interstate Bridge, Lewis and Clark, Hood River, and Astoria-Megler Bridges were tolled to cover capital construction costs and, for port-owned bridges, operating costs. In 1995, the Oregon State Legislature passed Oregon Revised Statute (ORS) 383, enabling the exploration of tolling on the Newberg-Dundee Bypass, the Tualatin-Sherwood Connector, and an unspecified project in the Portland area. The 2003 legislature established the Oregon Innovative Partnerships Program (OIPP), to allow, among other things, private firms to build and operate toll roads with the state owning the underlying asset. Legislation through the years, most recently revised in 2007, covers toll ways and rules for developing tolling projects.

The OIPP examined the tolling capability of three highway projects – the Newberg-Dundee Bypass, widening South I-205, and the Sunrise Corridor – jointly with a private partner, the Oregon Transportation Improvement Group (OTIG) led by Macquarie Infrastructure Group. The OIPP and the private partner subsequently decided not to proceed with those projects because of a perceived lack of appropriate financial return on the private partner's investment.

Policy context relating to tolling in Oregon is not fully formulated, but policy does encourage the state to further consider tolling as a funding option. The OTP Strategy 6.4.1 states*: "Examine mechanisms to fund major capacity-adding and related transportation facilities that raise revenues including but not limited to tolling, congestion pricing…."* The plan does not provide any detail beyond these initial words to consider tolling as a tool. Other policies in the OTP encourage the use of alternative and innovative funding sources. Although tolling is not specifically mentioned in those policies, the OTP implies that tolling is an innovative source of funding.

Oregon Highway Plan (OHP) policies encourage the establishment of cooperative partnerships to make more efficient use of limited resources and support the efficient use of the transportation system through demand management strategies and use of High Occupancy Vehicle (HOV) and High Occupancy Toll (HOT) facilities.

Section 2.0: Toll Management Issues

When first considering the possibility of a tolling project, ODOT and local agency project champions will begin to ask, "What are we getting ourselves into?" Knowing up-front the management, policy, and legal issues associated with building and operating a tolled facility can help answer those questions and could affect the decision to toll.

The management of toll facilities should reflect the overall goals established for toll projects and programs, as well as the local legislative and institutional structure within which they are developed. The implementation of tolling also requires physical infrastructure and administrative systems and procedures to collect tolls, enforce toll payment, and maintain the necessary accounting systems. This section provides an overview of the management, operational, and legal factors that should be assessed when considering the possible use of tolls in Oregon.

Key management questions include:

- Who owns and operates tolled facilities?
- What are the financial risks of ownership?
- What are some of the policy and legal challenges involved in deciding to build a tolled facility?
- What changes to Oregon policy, rules, or law might be necessary to implement a tolling project?
- How are tolled facilities financed?
- How will the tolled facility be built and managed?
- How will toll collection be enforced?
- What is the role of public perception in tolled facilities?
- How would the tolled facility perform? This question will be answered in detail in Sections 3 and 4 of this report.

Who owns and operates toll facilities?

Across the nation, there is a wide variety of agencies that are developing and operating toll facilities. They include turnpike authorities that predate the Interstate highway system itself, state departments of transportation, as well as new state, county, and local toll authorities, public benefit corporations, and even transit agencies. Sponsoring agencies generally execute planning and environmental studies, raise project financing, oversee construction, and ultimately operate toll facilities.

In certain cases, public agencies may opt to team with private sector partners to develop tolling and pricing facilities (through a public-private partnership, or PPP). The term "public-private partnership" is used for any scenario under which the private sector assumes a greater role in the planning, financing, design, construction, operation, and maintenance of a transportation facility compared to traditional procurement methods.

The nation's recent experience with tolling and pricing proves there are multiple models for implementing and operating these projects, ranging from completely private tolling organization to a local, regional, or state tolling authority. Decisions regarding sponsorship will ultimately reflect agency capabilities, local conditions, state and local laws, and existing institutional relationships.

ODOT has been involved with owning only two toll facilities, the Astoria-Megler Bridge and the I-5 Interstate Bridge. Under state law, ODOT has the ability to build and own a toll road, and ODOT has conducted several studies of possibly constructing tolled facilities, but has not yet implemented any. Changes to state law in 1995 and 1997 allowed for private investment in toll roads, but subsequent studies have not resulted in the implementation of a toll project.

What are the financial risks of ownership?

There are financial risks to toll facility ownership. These come in the form of:

- Debt-Financing: State governments usually must provide legislative authority to enable debt financing and the issuing of bonds. Such legislation may establish caps on the amount of debt that can be outstanding at any given time. It also may establish parameters for using a combination of different funding sources to develop tolling and pricing projects. The amount of debt and the rating of bonds issued for construction are highly dependent on the expected revenue as well as on the capabilities of the agency or entity to build and operate a toll facility.
- Insurance or Risk Management: The toll authority will be responsible for liability insurance during and subsequent to construction of the facility. Larger authorities are self-insuring, which requires a reserve fund or some other method of funding to be established in case there is litigation that requires a large payment.
- Cash Flow and Solvency: The toll authority will need to pay off debt in regular payments over time. The ability to pay debt is highly dependent on the actual toll collections, long-term maintenance costs, operating costs, and any competing free routes.

What are some of the policy and legal challenges involved in deciding to build a tolled facility?

Answering this question is complex and requires a review of state and federal rules and regulations that include transportation and land use laws.

Federal Requirements

Federal Highway Administration (FHWA) policies relevant to tolling are covered under the Federal-aid Highway Program, Title 23 of the United States Code (23 U.S.C.), and allow for tolling under certain conditions both on and off the Interstate Highway System. These policies allow states and other public entities to toll motor vehicles:

- To finance Interstate highway construction and reconstruction (including conversion of HOV lanes to HOT lanes);
- For initial construction or reconstruction of federal-aid-eligible highways (except on the Interstate System) of toll highways, bridges, and tunnels, including the approaches to these facilities;
- Reconstructing, resurfacing, restoring, and rehabilitating of any existing toll facility;
- Reconstruction or replacement of free bridges or tunnels and conversion to toll facilities; and
- Preliminary studies to determine the feasibility of the toll projects mentioned above.

Other programs under the current transportation act -- the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) -- allow for tolling of existing Interstate highways to pay for construction or reconstruction projects that would otherwise not occur if toll revenues were not available for the project.

A number of overlapping legal frameworks affect the implementation of tolling and pricing projects. At the federal level, prior to the current transportation act (SAFETEA-LU), there were limitations placed on states that desired to establish new, federally funded toll roads and even more restrictions on placing tolls on existing highways included on the federal-aid system in order to pay for improvements. State and local jurisdictions have a greater flexibility to implement tolling on local roads and highways that have been, or will be, built without federal funding. Thus the majority of tolling and pricing projects implemented over the past 50 years have involved either the expansion of legacy toll facilities that were incorporated into the Interstate Highway System or new state or county toll roads.

SAFETEA-LU softens constraints on the use of tolling and pricing on the Interstate Highway System. Now, new toll roads can be created using tax funds, tolls, or a mix of tolls, federal aid, and other sources. Existing non-Interstate federal-aid highways can be converted to toll roads if reconstruction, rehabilitation, or capacity expansion is to occur. The authority to convert HOV facilities to HOT or Express Toll Lane (ETL) use has been extended by SAFETEA-LU to all Interstate highways in all states. The constraints on conversion of Interstate highway facilities to toll facilities have been modified slightly by the Interstate System Reconstruction and Rehabilitation Program (a federal program that was created to allow for three existing Interstate facilities nationally to be tolled). The new Interstate System Construction Pilot Program, which was created as part of SAFETEA-LU, is designed to permit tolling to finance construction of three new Interstate highways.

State and Local Requirements

A number of Oregon Revised Statutes apply to tolling and toll ways. These are summarized in Table 1 below.

Table 1. Tolling and Toll Way References in Oregon Revised Statutes

ORS Chapter/Section	Summary of Tolling/Tollway Applicability
267.200, "Transportation Districts," general power of districts	Allows for the establishment of mass transit and transportation districts for special uses.
267.320, "User charges, fees and tolls"	Allows the transportation district board to impose and collect user charges, fees and tolls from those who use the facility (toll way) operated by that district.
291.055, "Public Financial Administration," agency fees.	Sets rules on, and allows agency fees and exemptions, including tolls assessed under Chapter 383.
Chapter 366, "State Highways and Highway Trust Fund"	Requires "consideration of tolling prior to doing modernization project," and requires ODOT to determine what portion of the project construction and maintenance costs could be recovered through tolls, and for modernization projects requires tolls to be considered (among other factors) in determining whether to include the project in the STIP.
Chapter 367, "Transportation Financing, Projects"	Sets rules for funding of transportation projects. Allows use of loans from the Oregon Transportation Infrastructure Fund for projects including toll ways, but requires the loan provisions to be subordinate to the provisions of establishing the toll way under Chapter 383.
Chapter 381, "Interstate Bridges"	Allows ODOT to build and operate bridges over the Columbia River connecting to Washington state, and allows assessment of tolls on such bridges to pay for construction, maintenance, and operating costs.
Chapter 383, "Toll Ways" (Last updated 2007)	Establishes authority of Oregon Transportation Commission (OTC) to approve a tolled facility and requires the Commission to establish rules under which the toll road would operate. Allows local agencies to build and operate toll roads. Allows cities or counties to create a toll way on roads under their jurisdictions. Establishes a State Tollway Account, a separate account within the Highway Trust Fund, which ODOT may use for toll studies and projects. Allows ODOT to take possession of a toll way under certain adverse circumstances. Requires toll way to be designed to state-approved standards and requires compatibility with technology used in the State of Washington. Allows for toll collection, enforcement (including video or photo enforcement), and penalties for not paying a toll when required.
801.305	Defines highway and what constitutes a city- or county-owned facility.

Source: Oregon State Legislature Web Site, www.leg.state.or.us.

As can be seen in the table above, Oregon statute (specifically, ORS 383.004) does allow for local agencies to create a toll facility; the statutes require approval through the Oregon Transportation Commission (OTC) and a contractual relationship with ODOT.

Nationally, a number of different state, regional, and local authorities are involved in the implementation of tolling and pricing projects. In Oregon, the existing tolled facilities (interstate bridges) are owned by ports. Toll facilities under consideration (Newberg-Dundee bypass, Tualatin-Sherwood Connector, Sunrise Corridor) have all at this point been studied with the assumption that ODOT would own the facility, even though consideration has been given to private or non-ODOT toll operators.

It would appear that Oregon's statutes are comprehensive with regard to establishing tolled facilities and they allow local entities to establish their own toll ways. However, policy makers interested in pursing tolling and pricing projects should consult with legal experts to identify the specific requirements and agreements that would be needed for their proposed project. These include:

- An agreement with ODOT (interagency agreement or memorandum of understanding) regarding the rules and responsibilities for the toll road study, including who is financing the study (ORS 383.004-005).
- Parameters, in agreement with ODOT, on what constitutes a promising toll project and how decisions will be made to move the project forward (see discussion later in this paper about tolling parameters and the STIP) (ORS 383.004-005).
- If a toll project is to move forward, an action from the OTC approving the toll facility and authorizing imposing tolls (ORS 383.004-005).
- A contract with ODOT to establish the toll way, along with financial and operating responsibilities, and provisions in case the toll operator (if not ODOT) cannot continue to operate and maintain the toll road (ORS 383.005-027).
- Clarification of legal authority to enforce toll payment and traffic laws on the facility and provisions for incident and emergency response. While the Oregon Revised Statute gives toll operators (both public and private) the authority to enforce toll collections, it does not provide specifics as what law enforcement authority is legally authorized to provide enforcement of traffic laws on the facility (such as speeding, improper driving maneuvers, etc.). An interagency agreement with ODOT, Oregon State Police (or local law enforcement agency), and emergency responders regarding enforcement and emergency/incident response responsibilities on the toll way will be necessary. This interagency agreement will need to include the Department of Motor Vehicles in order to retrieve license plate information for vehicles if video or photo enforcement is used (ORS 383.035-075).

What changes to Oregon policy, rules, or law might be necessary to implement a tolling project?

Oregon legislation and administrative rules will likely need to be revised or modified to accommodate the following:

- Variable or dynamic pricing: varying tolls by time of day or by congestion levels in the tolled facility, to provide traffic or congestion management.
- Special exemptions or toll reductions, such as for special vehicles types (such as hybrids or low- or zero-emission vehicles), differing auto occupancies, trucks, etc.
- Reciprocity agreements with other states to allow the toll operator to tap into motor vehicle records to retrieve information on out-of-state violators.

How are toll facilities financed?

Most toll roads are financed by debt backed by future toll revenues. Toll-based finance is straightforward and very much akin to the municipal finance model. As mentioned above, Oregon's statutes allow ODOT or another toll authority (under agreement with ODOT) to be vested with the responsibility of developing toll roads within its given jurisdiction. After completing the appropriate feasibility studies, the authority issues bonds against anticipated toll revenues and uses the proceeds to fund the construction of the toll road.

Once the toll road is open to traffic, the authority pays back its debt and interest costs using toll revenues collected on the facility. This model is attractive to investors because the interest they make on their holdings is exempt from federal and state income taxes.

The toll-based finance model may also be used in conjunction with the State Tollway Account (under Section 383 of the ORS; see Table 2-1) and any public-private partnership formed for the toll project. In this case, the private sector partner would arrange financing for the project and then repay the debt from toll revenues. In the past, private activity debt for toll projects could not be issued on a tax-exempt basis. However, with the passage of the SAFETEA-LU in August 2005, those limitations were modified, allowing private debt to be issued for toll projects on a tax-exempt basis. The law also limits the total amount of such bonds to $15 billion nationwide and directs the Secretary of Transportation to allocate this amount among qualified facilities.

How will the tolled facility be built and managed?

The toll authority will be faced with questions about project delivery, or how the toll facility will be built, and also about who will manage and pay for operations, enforcement, and maintenance.

Two principal project delivery methods are available: design-bid-build and design/build/operate. Design-bid-build is the traditional method for constructing a transportation facility, in which an agency will contract for the design and then separately for construction of a facility, and will retain responsibility for operations. The design/build/operate delivery method is one in which an agency will contract with a private or quasi-public entity, such as a toll authority, to design, build, and operate the toll facility for a period of time. Design/build/operate is the project delivery method that has most commonly been used for recent toll facilities in the United States.

When a separate entity is responsible for design, construction, and operations, long-term agreements will need to be in place to define ownership, operations, overall management decision-making, enforcement, and maintenance responsibilities of the tolled facility.

How will toll collection be enforced?

Oregon statute allows for "traditional" enforcement (law enforcement official physically present and intercepting a vehicle suspected of violating a toll rule) as well as photo or video surveillance. Video surveillance is the general trend in enforcing toll collection, both for toll facilities that use manual toll collection and for those that use Electronic Toll Collection (ETC) technologies. This approach involves the use of in-lane cameras at tolling points, which are triggered when a manual violation occurs or an incomplete or anomalous ETC transaction is detected. A violation or anomalous transaction could be, for example, a mismatch between tag and vehicle class, a vehicle entering with no tag, or a vehicle using a lost, stolen, or otherwise invalid tag. In such a case, the ETC systems communicate in real time with in-lane toll violation cameras that capture an image of the license plate of the suspect vehicle. The image and

other information related to the anomalous transaction are then transmitted digitally from the lane to a computer on-site at the toll facility and on to a main computer that receives similar information from all tolling points.

At the photo collection point (which could be a toll operator's office or a separate vendor), each image linked to a transaction is viewed for clarity and checked against a list of registered program subscribers before an invoice for the toll and administrative fee is mailed to the violator. In Oregon, the toll operator is allowed, under agreement with ODOT, to utilize Department of Motor Vehicle records to verify the names and addresses of the registered owners of the violating vehicles.[1] Reciprocity agreements will need to be established between states using compatible ETC systems in order to obtain out-of-state vehicle information.

In Oregon, photo/video enforcement is covered by legislative action, and is based on tort offense: owners are assumed to be operating the vehicle registered in their name and are allowed to submit an affidavit to the enforcing jurisdiction if they wish to claim they were not driving the vehicle that was reported as a violator, or to submit a claim as to why their action should not be considered a violation. Under photo/video enforcement, violators generally receive a warning and/or a fine (toll plus administrative fee) through the mail that contains the license plate image with the date, time, and location of the violation.

What is the role of public perception in tolling facilities?

Public outreach is an essential element throughout the planning and implementation of any toll project. Carefully planned and executed public outreach plays a critical role in helping develop tolling and pricing projects that will have the widest public appeal. Public outreach and education allow the public to consider the advantages new tolling and pricing facilities can provide and ultimately can help the public accept them as a new travel option. Key public acceptance issues include the perception of tolls as a tax, the appropriate use of toll proceeds, and concerns about equity among users.

Early involvement by a project champion is often essential to successful outreach efforts for tolling and pricing projects. A particular group or individual may step forward to express initial interest in and support of the proposal, or project sponsors may seek to identify potential project champions early in the public involvement process. In some cases, champions may come from organizations and interest groups that are not traditional supporters of roadway projects.

An effective public involvement strategy requires guiding the stakeholders through each step of the project, with comprehensive information being provided during the life of the project; inviting maximum public participation in the process; and documenting all feedback received. The following stages are involved:

- Market Research: Gathering information early in the process allows decision-makers to gain insight into public attitudes, opinions, and knowledge, and learn what is acceptable and what is a deal-breaker with respect to tolling and pricing. Early research efforts should include local chambers of commerce and business associations, as well as public interest organizations concerned with transportation issues. Focus groups can help identity key issues, and stakeholder interviews provide the opportunity to explore how these issues might be addressed.

[1] Oregon Revised Statute Chapter 383, Section 006 (ORS 383.006): "**Authority of toll way operator**. A toll way operator may operate toll booth collections, an electronic toll collection system, a photo enforcement system or any combination of toll booth collections, an electronic toll collection system and a photo enforcement system. [2007 c.531 §6]"

- Public Outreach: Once a decision has been made to assess the feasibility of tolling and pricing, outreach activities must focus on educating the public about and soliciting their feedback on the options being considered. Feedback is obtained from public meetings, focus groups, newsletters, websites, and formal hearings and is used to refine plans and ultimately implement more effective projects.

  Tolling and pricing are often new concepts to the public, and public outreach for these types of projects involves a greater focus on education than those for traditionally funded projects. Tolling and pricing projects involve a market-oriented approach. Education is needed to ensure that the public understands the market and financial context for deciding to implement these projects, as well as the travel benefits they will experience in terms of travel reliability and time savings. Education should include a clear problem statement identifying the need to consider tolling. In addition, outreach efforts must communicate the critical function that user fees play in providing these benefits and provide information on how and by whom tolls will be collected, and how toll revenues will be used.

How would the tolled facility perform?

Most toll roads in the United States are expected to be engineered, constructed, and operated at the same high standards as the Interstate Highway System. In Oregon, the toll entity must reach agreement with ODOT on the standards to be used for the toll facility; they may be less stringent than the standards for Interstate highways. Safety and efficient travel conditions are paramount. Given that motorists pay to use toll roads in lieu of other free alternatives, toll roads must provide value for money and excellent safety and travel conditions, as well as meaningful time savings.

A wide range of performance standards are usually established for the authorities responsible for operating toll facilities. These standards cover design, construction materials, maintenance, toll collection, snow removal and other weather-related needs, incident management, and overall safety levels. Toll authorities and their boards are responsible for seeing that these various standards are met.

Performance standards for toll facilities – or a suitable process for identifying appropriate standards – need to be established at the same time the entity responsible for implementing a toll project is vested with that responsibility. This process normally involves extensive dialogue with state departments of transportation. The resulting operational standards are likely to be included in the same legislative action that establishes the overall toll authority for a project.

Section 3.0: Tolling Applications

Well before an agency such as ODOT decides to build a toll facility, decisions will need to be made about whether such a toll application is appropriate. There are two factors that are typically considered as the decision is made:

- Does the proposed improvement lend itself to a tolling application? Is tolling a sufficient answer to address the stated problem?

- Does the proposed toll facility meet certain performance thresholds that would make it a viable tolling project?

This section will address the first question. The next section focuses on the performance measures to evaluate tolling applications.

Tolling provides decision-makers the advantage of a new source of revenue that can be leveraged to deliver costly improvement projects. At the same time, advances in toll collection technology provide the opportunity to use pricing to encourage drivers to consider travel options that can reduce congestion. Other goals often associated with tolling and pricing include expediting the delivery of new transportation improvements and, in certain cases, engaging the private sector as investment partners in project development. This paper addresses two tolling objectives – tolling to generate revenue that can be used to pay for transportation improvements and toll pricing strategies that are used to manage traffic congestion. More specifically:

- *Tolling* strategies involve the imposition of fees for the use of a roadway facility, primarily to generate revenue. Classic examples include fixed fees that motorists pay – usually based on the number of axles or vehicle weight – to cross a bridge or tunnel or drive on a tolled highway facility.
- *Congestion management* objectives are achieved by varying toll rates by time of day or traffic volume level in a way to manage congestion or facility use and to ensure a reliable travel time through the corridor. For example, on an HOT lane, the price for low occupancy vehicles to use the facility varies depending on congestion levels and operating speeds at a given time in the HOT lane.

A range of tolling applications was identified in a report completed recently for the Oregon Department of Transportation and compared to various objectives of tolling. The components of that report that are the subject of this paper are presented in Table 2 below.

Table 2. Ability of Tolling Applications to Achieve Revenue and Congestion Management Objectives

Application	Maximize Revenue Generation	Reduce Recurrent Delay & Improve Travel Time Reliability
Traditional		
New terrain toll road New toll bridge New toll tunnel	Need to weigh against other objectives	Likely yes, at least in the short to mid term
Toll Managed Lane		
HOV to HOT conversion	Likely public policy decision would be to maximize flow, rather than revenue	Yes, provided that toll policies are in place to minimize impacts to existing HOV users
New HOT lane		Yes, as an added lane
General Purpose (GP) lane to HOT lane conversion		Yes for HOT lane users; will likely worsen travel time and delay for GP lane users
New Express Toll Lane (ETL)		Yes, as an added lane
GP lane to ETL conversion		Possibly yes on ETL, potentially no or worsen on GP; need to examine potential diversion onto other routes
Toll Existing Corridors or Systems		
Replacement bridge as toll bridge (potentially with expansion)	Possible, but a difficult political choice; revenue-maximizing tolls likely to create public backlash	Likely yes, at least in the short term, due to added capacity
Convert existing freeway to toll way		Likely yes, at least in the short term, due to added capacity; need to be careful about unintended consequences such as diversion onto parallel routes

Source: The Future of Tolling in Oregon: Understanding How Varied Objectives Relate to Potential Applications, Cambridge Systematics, August 2007; revisions by Parsons Brinckerhoff.

Each of the toll applications or categories—toll roads on a new alignment, new and replacement major bridges, conversion of HOV facilities to HOT operations, and the introduction of tolls on existing facilities—is assessed below for its ability to achieve the objectives of revenue generation and congestion management. The types of physical settings where they would be appropriate, based on experience with similar efforts in Oregon and other states, are also discussed [2].

[2] This report does not consider the potential use of tolling to either finance improvements to, or meter the use of, unique recreational facilities, such as parks or scenic highways.

Assessment of toll applications

Toll roads on a new alignment

Most of the recent tolling projects in the United States have been expensive and extensive projects built by local toll authorities not directly affiliated with state departments of transportation in large, expanding, and congested metropolitan areas. These areas include Dallas, Houston, Miami, Orlando, Tampa, Denver, and Orange County, California. These facilities provide the traveling public with easily recognized mobility benefits, including quicker and safer travel conditions and new transportation options.

In Oregon, it is unlikely that any large, new tolled facility would be constructed within the established urban growth areas around the state, although conversions of existing facilities or lanes may be possible. The amount of development that has already occurred, the environmental and land use protections in place, and the need to comply with established planning rules and regulations would likely preclude a new facility in urban areas. However, new alignment toll roads may have more potential in rural areas or in urban fringe areas, such as the Sunrise Corridor or Newberg-Dundee Bypass, where potential impacts are less pronounced.

For the recently constructed urban toll roads around the country, local transportation authorities have taken the lead in implementing the projects. Given the fact that federal law has not historically allowed tolling on the Interstate system, these projects have been state or county highways. These toll projects also have benefitted from the fact that they have been put forth as local solutions to local transportation needs and have often required approvals from local governments or through referenda. Experience in Washington and Colorado has shown that when state departments of transportation undertake regional or statewide tolling feasibility studies, they may lack the local support needed to move toll projects forward.

For rural or urban fringe applications in Oregon, it is unlikely a new alignment toll facility would generate sufficient traffic volumes to enable the facility to be self-funding and self-supporting. A check of toll roads around the United States that are considered self-supporting indicates that their daily traffic volumes are greater than 40,000 to 50,000 vehicles per day. In Oregon, a check of the 2007 Transportation Volume Data Tables (from ODOT's web site) indicates the only state highway with rural volumes approaching these levels is I-5 between Albany and Portland. However, there are sections of state highways in urban fringe areas or smaller urban areas around the state (Bend, Ashland, Medford, and Grants Pass) that carry over 30,000 vehicles per day. Belt Line Road in Eugene carries over 50,000 vehicles per day. The west Salem bridges carry over 88,000 vehicles per day. At volumes such as these, tolling a new alignment road could be part of the overall funding picture for rural or smaller urban areas.

The decision to build a new alignment toll road could arise from local and regional transportation planning decisions. For example, tolling could work when a particular ODOT region has an unfunded project that continues to be its highest priority, but the amount of state and federal funding available to the region is insufficient to cover the construction cost of the project. Because ODOT programs resources primarily with targets by region, rather than through a statewide priority process, a particular ODOT region may not have sufficient transportation funds to program its high-priority projects. When such a scenario occurs, there are three situations in which tolling could be viable:

- When tolls, as one of several funding sources, would reduce the unfunded gap sufficiently to move the project to a higher funding priority.
- When the need for the facility has been determined by the region to be a high priority, such as the case of new access to a port or an airport, a new intermodal facility, or a bypass.

- When ODOT could impose a toll on another project that would have a higher revenue return, and then shift the programmed public funding from the tolled project to the new alignment project in order to implement that project. This approach is described in more detail in Section 5.

New and replacement major bridges

Tolling has been used on major bridge and tunnel crossings around the country. Major bridges are defined as bridges over large rivers, such as the Columbia River or Willamette River, that typically have higher design standards (such as 75-year life spans) and are more expensive to build than other bridges.

The public generally recognizes that major bridges are expensive structures and, with appropriate outreach, is more likely to support the use of tolls to finance reconstructed or new crossings than to support tolls for other types of roadway projects. For example, public opinion surveys collected from users and non-users as part of a study on the currently tolled SR-35/Columbia River Crossing (replacement of the White Salmon/Hood River Bridge) found general support for increased tolls provided they would fund a bridge replacement project. Support did start to decline, however, when toll amounts increased significantly above the current toll and when disagreements arose as to what the bridge replacement project should include.

When a new major bridge crossing is being considered to add to river crossing capacity, other factors need to be considered regarding the appropriateness of tolling. These include the need for the new crossing (how congested or hazardous the existing crossing is), proximity of free crossings that could compete with the tolled facility, public opinion regarding the need for such a crossing, as well as the cost of the project, how much of the project would be financed with tolls, and who would own and have financial responsibility for the new crossing.

Objective, historical traffic volumes for most existing bridges and reliable travel demand forecasts for these types of facilities help reduce revenue risks associated with new major bridge facilities. As Oregon assesses its need to replace existing bridges, it can complete financial feasibility assessments to determine what portion of the cost of replacement bridges could be financed from toll proceeds. At the same time, local decision-makers should assess local public opinion on the possible use of tolling and review the institutional structures that would need to be put in place in order to toll the replacement facilities.

Instances where tolling for a new bridge crossing would be appropriate include:

- Where there are limited, competing free (no toll) facilities in proximity.
- When trips to use the facility tend to be within the desired travel path, rather than substantially out-of-direction.
- When the major bridge improvement or new crossing is consistent with Oregon land use and planning regulations.
- When frequent-user toll reductions can be made available for frequent users (typically this occurs when the bridge provides the sole, reasonable transportation access between two communities or along a major route) with minimal impact on the ability to pay down construction bonds.

Conversion of existing HOV facilities to HOT operations

The conversion of existing HOV facilities to HOT operations may be considered when the existing facilities have the capacity to accommodate additional vehicles during peak periods. HOT lanes use variable pricing for toll rates for regulating the flow of paying vehicles to ensure that free flow conditions are maintained at all times, and especially during peak travel periods.

Experience with HOV-to-HOT conversions around the country demonstrates that HOT operations are viable only in densely populated metropolitan regions with high congestion levels. These types of conversions have been implemented in San Diego, Seattle, Salt Lake City, Denver, Houston, and Minneapolis and are being contemplated in a number of other regions of similar size.

For the most part, HOT lanes, when appropriately implemented, generate sufficient revenue to cover their operations and maintenance costs. In some cases, the higher volume HOT lanes will generate some excess revenue that can be made available for improvements, equipment upgrades, or transit service along the corridor.

In Oregon, there are limited opportunities for undertaking appropriate HOT lane projects. At this time, only one facility, I-5 in North Portland, operates an HOV lane. It is possible that converting that facility to an HOT lane would have some merit. However, the lane still ends at a bottleneck (Interstate Bridge), which creates congestion at the north end of the current HOV lane.

The introduction of tolls on existing facilities

Tolling may be considered when new capacity is added to existing free facilities, particularly in congested metropolitan settings. In such cases, the entire facility could be tolled to provide construction revenue, or tolls may be charged on just the new lanes, with the pre-existing lanes remaining toll-free. Under this scenario, the managed lanes could be operated as Express Toll Lanes, and all vehicles using them would pay a fee. In addition, that fee could be modified based on demand in order to manage congestion. The new capacity also could be operated as HOT lanes. Again, this tolling scenario would be most appropriate in a congested metropolitan region.

SAFETEA-LU continues the Interstate System Reconstruction and Rehabilitation Toll Pilot Program established in the previous Federal Highway Act (Transportation Equity Act for the 21st Century, or TEA-21) to allow tolls to be introduced on up to three existing Interstate facilities in the nation. This program would cover the cost of reconstruction or rehabilitation work that would not be possible without the collection of tolls. A number of states have explored the possible use of a tolling authority provided by this program, but none have implemented tolls. There is a strong perception that the traveling public would not find it acceptable to have tolls introduced on an existing highway that has been operated without tolls in the past unless major improvements were provided as a result. Tolling could be considered on existing major bridges if funding were lacking for a needed improvement and if there were a concerted outreach effort to educate the public of this need.

When tolls conflict with policy

Policy makers may sometimes need to balance public policy goals and the traditional tolling structure when there are or may be conflicting goals in implementing a toll project. These conflicts include instances when a tolling project would result in unintended adverse economic, land use or environmental impacts.

Table 3 below summarizes a range of circumstances under which tolling applications may be appropriate.

Table 3: Tolling Applications and Potential Policies

Measure/Application	New Alignment or Greenfield Toll Road	HOV-to-HOT Lane Conversion	New or Replacement Major Bridges	Tolling Existing Facilities
Applicability (what vehicle type could be tolled)	Toll applied to all vehicles.	Those not meeting HOV criteria are tolled. Trucks generally are not eligible to use HOT lane.	Toll applied to all vehicles.	Toll applied to all vehicles.
Operating Policy	Typically 24-hour.	For Oregon, likely peak period applications only. Elsewhere in the U.S., 24-hour or during-the-day operating periods (but these typically are where HOV lanes are 24/7 or have extended operating periods).	Typically 24-hour.	Typically 24-hour, but depends on reason for tolling the existing facility. For traffic management purposes, the tolling could be during peak periods only.
Exemption Options	Could apply reduced toll to HOVs, hybrids, and motorcycles.	HOVs and motorcycles must be exempt (under SAFETEA-LU).	Could exempt HOVs, low-emission vehicles, and hybrids. Frequent-user discounts are possible.	Could exempt HOVs, low-mission vehicles, and hybrids. Frequent-user discounts are possible.
Where Applied	Limited urban applications possible in Portland area and perhaps some bypass-type options similar in other metro areas. Potential rural applications.	Urban areas only, primarily Portland metropolitan area.	New or rebuilt crossings of the Willamette, Columbia, coastal, and possibly Snake rivers.	For Interstate highways, must adhere to federal statutes. Some potential on expressways. Limited applications on non-freeway/non-expressway facilities.

Section 4.0: Tolling Performance Parameters

The previous section identified project circumstances under which tolling may be appropriate. This section looks at policy and project characteristics in more detail to define a set of possible and reasonable thresholds and performance measures to assist policy decision-makers and planners in determining tolling applicability for particular situations. Lessons learned from previous tolling projects and studies are taken into consideration. The intent is to help jurisdictions eliminate the option of tolling in situations where it is not likely to be feasible.

In most cases, it is unlikely a toll project will pay for the entire construction cost. However, many projects, if tolled, could provide a substantial portion of the project funding with tolls and enable the project to move forward.

Because Oregon could likely face differences of opinion on quantifying tolling project thresholds, performance measures could provide a more objective approach to assisting with project decision-making. These measures could be used by ODOT policy makers, local governments, MPOs or Area Commissions on Transportation (ACT) as well as by the Oregon Transportation Commission. Proposed performance criteria include traffic, travel time and congestion, proximity of parallel free facilities, safety, access to major land uses, and the initial infrastructure cost of toll collection (additional right-of-way, toll collection, signage, etc).

Traffic considerations

The amount of traffic and the volume of trucks on a facility are indicators of whether a given facility may be a good candidate for tolling. Many of the toll roads and bridges in California, Texas, and in the eastern United States carry very high traffic volumes. Tolls paid for the initial project and continue to pay for operations, maintenance, and eventual upgrades to the facility. In Oregon, the two current toll bridges each carry between 10,000 and 20,000 vehicles per day. Toll revenues are sufficient to cover operations and maintenance, but are not sufficient to pay for a replacement or new major bridge in either case.

Traffic volume and percentage of truck traffic are two factors to consider when evaluating toll effectiveness:

- Total traffic volume: As seen in Oregon and elsewhere, a facility that carries, or would carry, fewer than 20,000 vehicles a day would not generate sufficient toll revenue for tolls to be a substantial part of the project cost. The SR-35/Columbia River Crossing study analyzed the revenue potential of several toll options for replacing the Hood River/White Salmon Bridge and concluded that existing tolls would need to be more than doubled to achieve a level paying for approximately 30 percent of the project cost.

  In considering low-volume roads or bridges (those with daily volumes below 20,000 vehicles a day), the project sponsor should consider carrying out a financial study to estimate the toll revenue assuming a variety of different tolling scenarios. This could include alternative toll rates and policies regarding toll differentials for different classes of vehicle, possible incentives (i.e., discounts) for vehicles using ETC, or variably priced tolls, where higher rates are charged for trips made during peak travel periods. Regardless of the specific tolling rates and policies

used, projects with higher traffic volumes have higher potential for a substantial portion of the project cost being paid for with tolls.

- Trucks: In Oregon, trucks are assessed a separate user tax based on weight and length of trip within Oregon. An individual truck can consume as much road capacity as up to six passenger cars.. However, the freight movement the trucking industry provides contributes to a major component of Oregon's economy. Trucks typically are assessed a toll based on number of axles, and based on this type of toll, trucks have a higher per-vehicle toll than passenger cars. Facilities that would carry a high percentage of trucks (20 percent or more) would have higher toll revenue potential than facilities where trucks make up a small percentage of all vehicles.

Travel time and congestion

Travel time saved is an important performance measure for toll facilities. Studies conducted in other states have shown that users are attracted to priority facilities, such as HOV lanes, if they can save five or more minutes on their work trips. In California, studies have shown that some of the toll roads are saving users 15 to 20 minutes per trip. These travel time savings are measurable and are noticeable for the potential user. The advantages of reduced travel time create a significant incentive for paying a toll to make the trip.

When travel time saved by using a toll facility is less than five minutes, or when users perceive a low amount of travel time savings, the incentive for travelers is small. This incentive also is reduced if users believe they would experience similar travel time and congestion using a toll facility compared to an adjacent free facility.

Congestion levels and proximity of free facilities

The level of congestion on a facility and the proximity of free, generally parallel roadways provide another performance measure that can assist with making decisions about tolling applicability.

Some of the toll roads constructed in California in the late 1980s and early 1990s experienced competition from free facilities. When public agencies built improvements on parallel free facilities, potential toll road users had a greater incentive to use the free facility rather than the toll facility. Toll revenue was therefore not as high as had been expected. This issue led to the development of no-compete clauses in private and quasi-public toll road contracts with departments of transportation. The existence of close-by parallel and adjacent facilities, their congestion levels, and travel times on those facilities should be evaluated as part of the decision-making on whether a toll road would attract users. If congestion levels on free facilities are not extreme or do not extend over many hours of the day, it is likely they will continue to be attractive to users thus reducing or limiting toll revenue.

Although travel time is generally a good surrogate for measuring congestion, there are instances in which visible congestion may attract users to pay a toll in order to bypass the observed congestion, despite the lack of significant travel time differences. For example, with HOT lane projects, users may choose to pay a high toll (over $10 per vehicle), even if the travel speed on the managed lane is lower than what is typically guaranteed, perhaps because the user has previously observed congestion on the adjacent free facility. Customer willingness to pay a toll is based, in part, on the reliability of consistently being able to make the trip in a specified amount of time. Although it is

difficult to predict nonrecurring congestion, such as accidents or incidents, newer traffic models for tolling, such as micro-simulation models, can measure recurrent congestion. This information provides another way to assess potential performance of a proposed toll facility.

Safety

Although safety is typically not what attracts users to a toll facility, safety can be a potential performance measure. Relevant questions for decision-makers to consider include:

- Would construction of a new, tolled facility serve to improve safety along an adjacent, free corridor that has been designated a high-accident corridor?
- Are there recurrent accident problems along an existing free corridor and would construction of an exclusive tolled facility give users a measure of reliability in their travel time?

Access to major land uses

Meeting the access needs of major regional facilities, such as airports, ports, major recreational destination facilities, and large multi-use developments, may be an additional consideration in the tolling decision. Facilities such as the Dulles Airport Access Road have a combination of tolled and free lanes (the free lanes are for airport-bound traffic only, while the tolled lanes provide local access along the corridor). In Ogden, Utah, a toll road was built for primary access into a large, mixed residential and commercial development (those who live in the development are given toll waivers). A toll road was built into Disney World near Orlando, Florida, to provide a low-congestion alternative to the free access roads into the park.

Potential tolling scenarios

When a tolled facility is being considered, there should be a discussion of a variety of tolling scenarios that could be evaluated. For example, the levels of the toll or whether toll exemptions or reductions should be considered as scenarios examined in a toll study. Examples include:

- Toll levels (usually expressed in current-day dollars): What range of tolls should be considered? How will toll levels affect use of the toll facility? What are the projected traffic levels over time, under the various toll levels?
- Will tolls be varied by time of day or by congestion level?
- Exemptions and reductions: Should some users of the facility be exempt, or allowed to have a reduced toll? These exemptions or reductions will have an impact on toll revenue. Discussions about how the toll may affect low income and minority individuals, who are frequently the populations negatively affected by new freeway/toll way facilities, and whether they should be exempted from tolls, may be appropriate (or whether to propose reduced or no tolls as a mitigation measure for the environmental consequences of the project).
- Truck tolls: The role of the trucking and goods movement industry in the region, together with the impact of tolling on this industry's operations, is another consideration.
- For HOT lanes, there are continued debates about whether motorcycles, low-emission and hybrid vehicles, and other specialty users should receive toll exemptions.

Summary of potential performance measures

Table 4 below summarizes examples of performance measures that could be evaluated to consider whether tolling is appropriate.

Table 4: Potential Toll Application Rating System Using Performance Measures

Measure/ Application	New Alignment or Greenfield Toll Road	HOV-to-HOT Lane Conversion	New or Replacement Major Bridges	Tolling Existing Facilities
Daily Volumes	<20,000 = Low 20,000 – 60,000 = Medium >60,000 = High	Based on volume-to-capacity ratio or ability to maintain a minimum guaranteed speed.	<20,000 = Low 20,000 – 60,000 = Medium >60,000 = High	<20,000 = Low 20,000 – 60,000 = Medium >60,000 = High
Travel Time Savings (compared to existing corridor or no-build alternative)	Little or no improvement = Low Measurable = Medium Substantial = High	Measured along HOT facility: Little or no improvement or negative impact on HOV speeds = Low Measurable improvement with no negative impact on HOV speeds = Medium Substantial improvement, zero negative impact on HOV speeds = High	Little or no improvement = Low Measurable = Medium Substantial = High	Little or no improvement = Low Measurable = Medium Substantial = High
Traffic Management – congestion levels on adjacent or parallel facilities potentially relieved by tolling application (based on modeling or other travel demand estimation)	Little or no relief = Low Moderate reduction of traffic delays on parallel facilities = Medium High level of reduction of traffic delays on parallel facilities, or existing "free" facility has multiple hours per day where volumes exceed capacity = High	Little or no relief = Low Moderate reduction of traffic delays on parallel facilities = Medium High level of reduction of traffic delays on parallel facilities, or existing "free" facility has multiple hours per day where volumes exceed capacity = High	Little or no relief = Low Moderate reduction of traffic delays on parallel facilities = Medium High level of reduction of traffic delays on parallel facilities, or existing "free" facility has multiple hours per day where volumes exceed capacity = High	Little or no relief = Low Moderate reduction of traffic delays on parallel facilities = Medium High level of reduction of traffic delays on parallel facilities, or existing "free" facility has multiple hours per day where volumes exceed capacity = High
Existence of Proximate or Competing Free Facilities	Close (within a mile) = Low In vicinity but not close = Medium Remote (more than 3 miles away) = High	General purpose lanes are within the same facility. If they are heavily congested, they won't compete very well with HOT lane.	Close (within a mile) = Low In vicinity but not close = Medium Remote (more than 3 miles away) = High	Close (within a mile) = Low In vicinity but not close = Medium Remote (more than 3 miles away) = High

Measure/ Application	New Alignment or Greenfield Toll Road	HOV-to-HOT Lane Conversion	New or Replacement Major Bridges	Tolling Existing Facilities
Multimodal	No toll exemption for buses, or no transit service gained as part of project = Low Some toll exemption for buses, some transit services gained as part of project = Medium Transit has toll exemption, excess toll revenue can fund high level of peak transit service = High	Unlikely to fund new transit service or facilities. FHWA will require no negative impact on HOV/bus speeds.	No toll exemption for buses, or no transit service gained as part of project = Low Some toll exemption for buses, some transit services gained as part of project = Medium Transit has toll exemption, excess toll revenue can fund high level of peak transit service = High	No toll exemption for buses, or no transit service gained as part of project = Low Some toll exemption for buses, some transit services gained as part of project = Medium Transit has toll exemption, excess toll revenue can fund high level of peak transit service = High
Revenue Return	Low traffic volumes, low proposed toll = Low Medium traffic volumes, low or medium proposed toll, or high traffic volumes, low proposed toll = Medium High traffic volumes, medium or high proposed toll = High	National experience on corridors that carry 150,000 or more vehicles a day is that revenue will cover operating and maintenance costs, or perhaps a little more, which goes into transit operations. Oregon has no corridors carrying 150,000 or more vehicles per day, but I-5 in Portland is projected to carry that level or higher levels well before 2040.	Low traffic volumes, low proposed toll = Low Medium traffic volumes, low or medium proposed toll, or high traffic volumes, low proposed toll = Medium High traffic volumes, medium or high proposed toll = High	Low traffic volumes, low proposed toll = Low Medium traffic volumes, low or medium proposed toll, or high traffic volumes, low proposed toll = Medium High traffic volumes, medium or high proposed toll = High
Diversion to Free Facilities (based on modeling)	Could be an issue especially if the toll authority has no-compete clause in the tolling agreement. High level of shift, perhaps enough to result in volumes exceeding capacity on adjacent facility = Low Some shift but not enough to cause substantial congestion on parallel routes = Medium Little or no shift onto parallel routes = High	Less likely to occur since HOT lanes are attempting to use up excess HOV capacity.	High level of shift, perhaps enough to result in volumes exceeding capacity on adjacent facility = Low Some shift but not enough to cause substantial congestion on parallel routes = Medium Little or no shift onto parallel routes = High	High level of shift, perhaps enough to result in volumes exceeding capacity on adjacent facility = Low Some shift but not enough to cause substantial congestion on parallel routes = Medium Little or no shift onto parallel routes = High
Access Management	Frequent local access, or > 3 driveways/mile = Low Infrequent or controlled access, 1-	Must be limited access facilities. Access as measured by ability to enter/exit HOT lane:	Typically should be limited access over the river.	Frequent local access, or > 3 driveways/mile = Low Infrequent or controlled access, 1-2

Measure/ Application	New Alignment or Greenfield Toll Road	HOV-to-HOT Lane Conversion	New or Replacement Major Bridges	Tolling Existing Facilities
	2 driveways per mile = Medium Limited access, no driveways = High	Continuous access = Low Buffer separation, access every 1-2 miles = Medium Buffer or barrier separation, access > 2 miles apart = High		driveways per mile = Medium Limited access, no driveways = High
Oregon Planning Rule Implications	Potentially difficult to justify in urban areas if new roadway capacity increases reliance on single-occupant vehicles; need to demonstrate compliance with goals for reducing vehicle miles traveled per capita in Section 12 of the Statewide Planning Goals contained in the Oregon Administrative Rules (OAR 660-012-0000).	May be justifiable if it can be demonstrated that there is no net negative impact on HOVs.	Probably neutral – a new bridge will require inclusion in a transportation system plan, which will trigger Oregon Planning Rule review.	Probably neutral.

Rating system is as follows:

Low = Low potential for reasonable tolling application under this criterion.
Medium = Medium potential; shows promise, but borderline under this criterion.
High = High potential for reasonable tolling application; shows merit under this criterion.

Section 5.0: Consideration of Tolling in the STIP Process

Though they are both guided by federal regulations ("Metropolitan Transportation Planning," found in Chapter 23, Section 134 of the United States Code), the financial assumptions of long-range (20-25 year) transportation plans differ from short-range programming documents like the State Transportation Improvement Program (STIP).

The STIP is the primary document that programs federal, state, and local funding for transportation improvement projects statewide. If a project is to receive federal or state funding, it must be programmed in the STIP. Each ODOT region has a process, through Area Commissions on Transportation (ACTs) and Metropolitan Planning Organizations (MPOs), that prioritizes project requests within each ODOT region, and each region is allocated a funding target within which it must program its projects.

Because plans must cover many years, financial assumptions may include new or expanded revenue sources commensurate with community desires or expectations. Programming documents, sometimes called capital improvement programs (CIPs), describe what will be constructed over a much shorter period of time. For example, by federal requirement the STIP covers only four years.

This distinction is an important one because, in long-range plans, jurisdictions can include projects for which actual funding decisions have not been made. Further, financial assumptions made in the plan may, in fact, prove to be overly optimistic, meaning that some included projects will not be constructed in the plan's time horizon.

Based on the previous discussion of tolling, it is likely that most tolling projects in Oregon, with the exception of tolling existing capacity, would (1) be expensive, given the attributes required for success, and (2) not able to be totally financed by toll receipts. This means that before toll projects on the state system can be programmed in the STIP, additional revenue will have to be applied to the project. This section considers ways ODOT may wish to deal with this issue in its management of the STIP.

For purposes of projects that add highway capacity, called "Modernization," the STIP has two distinct sections: "Construction" and "Development." The Construction Section of the STIP describes those projects ODOT will construct over a four-year period and for which ODOT is financially constrained to available revenue sources.

The Development Section of the STIP is different. Capital projects, such as highway capacity enhancements, can take a number of years to be designed and meet environmental requirements. Projects ODOT desires to construct but that are still being designed and evaluated for environmental effects are identified in the Development STIP. Because of the indeterminacy inherent in developing large capital projects and the inability to anticipate all future funding actions at both the federal and state level, the Development STIP cannot be as precisely sized to available revenue. Some additional number of projects is typically included in order to ensure that all available revenue programmed for Modernization in any 4-year STIP cycle can be expended.

This is not to imply, however, that the Development STIP is not financially constrained, merely that it cannot be done as precisely as the Construction STIP. The Oregon Transportation Commission views projects included in the STIP as commitments made to the public, and ODOT strives to deliver 100 percent of projects identified in the STIP. It is for this reason that partially funded toll projects present a challenge: How should ODOT consider tolling projects with large non-toll revenue funding gaps?

There are two key aspects to consider in answering this question: (1) the availability of supplementary funding sources and (2) the ability to minimize the risk of including projects in the STIP that ultimately may not be successfully financed. Each aspect is discussed below.

Supplementary Funding Sources

There are a variety of revenue sources that may be available to supplement toll receipts to fund a toll project. There are also a variety of financing "tools" that can assist matching the availability of revenue over time to when it is needed for constructing a project. These include:

- Private or local government contributions
- Oregon Transportation Infrastructure Bank loans
- ODOT region Modernization funds
- Federal earmarks (including mega project categories)
- FHWA Innovative Finance Toolbox
- TIFIA loans or guarantees
- GARVEE or state bonding

Locally generated funds can include Surface Transportation Program (STP) funds allocated to a local jurisdiction through the Department of Transportation; local or regional fuel taxes; system development charges; donations of rights-of-way; or other taxes or fees levied within a city, county, or special district.

The Oregon Transportation Infrastructure Bank (OTIB) is a statewide revolving loan fund designed to promote innovative financing solutions for transportation needs. Oregon's program was started in 1996 as part of a federal pilot program. Because of the source of initial capital for the OTIB, most loans involve the use of federal funds. Legislative action in 1997 established the program in state law and expanded the bank's authority.

A region's STIP funds also can be part of the funding toolbox. Each region is allocated a portion of the state's Modernization funds, which may be used for any project or combination of projects determined appropriate in the STIP development and adoption process. Regions can potentially "swap" funds with other regions to gain sufficient funds for any one project in a given year, then "swap" them back in later years.

Federal earmarks are used on many projects in Oregon and perhaps don't need definition; however, certain characteristics are worth noting. The amount awarded can vary from the amount requested or needed to fund a particular project. Oftentimes, the funds need to be obligated within certain timeframes. Earmarks are not *additional* federal funds to the state; they are simply part of

the state's authorization from Congress, identified to be applied to a specific project, and can only be changed with Congressional approval. Oregon Transportation Commission's Policy #10 regarding earmarks, adopted May 2008, provides policy guidance on earmark requests and states a preference to use earmarks to bridge a funding gap, rather than supplant or provide only partial funding.

The FHWA Innovative Finance Toolbox includes innovative management of federal funds such as advance construction, partial conversion of advance construction, and credit assistance, including using Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA) loans and debt financing, such as GARVEE bonds, both of which are described below.

TIFIA loans provide federal credit assistance to nationally or regionally significant surface transportation projects, including highway, transit, and rail projects. The program is designed to fill market gaps and leverage substantial private co-investment by providing projects with supplemental or subordinate debt. A TIFIA loan can increase the amount by which a given toll revenue stream can be leveraged to produce construction dollars.

Grant Anticipation Revenue Vehicle, or GARVEE, bonds are bonds or notes that are repayable, either exclusively or primarily, with future federal-aid highway funds. These federal tax-exempt financing mechanisms are designed for funding state and municipal transportation projects. While GARVEE bonds represent a creative financing mechanism for cash-poor states that need immediate resources, they can tie up federal funding of future projects.

The difficulty with many of these sources is the *opportunity cost* associated with their use. The same sources may be available to projects throughout the state; thus, it may be inappropriate for local project sponsors to assume their use. For example, higher priority projects may exist elsewhere in the state. State bonding limits may preclude the use of GARVEE or state bonding. States that have used the GARVEE approach have tended to program projects on a statewide level, rather than by region. In short, local project sponsors cannot merely assume the availability of non-local revenue sources or finance tools because authority over their use rests with the state.

<u>STIP Management of Non-Fully Funded Projects</u>

A heightened consideration of tolling as a means of financing highway capacity enhancements implies a potential increase in the number of non-fully funded toll projects being included in the Development STIP. To ensure a more consistent and successful management of the STIP development by ODOT, as well as to promote cooperative relations with local communities throughout the state, ODOT may wish to consider adopting the following STIP guidance:

1. Consider for STIP inclusion only those toll projects ranked "high" under the tolling parameters discussed in Section 4.0;
2. Require that toll projects requesting statewide funds to supplement toll receipts have a formal financing plan that includes operational, maintenance, and preservation expenses;
3. Consider delaying or cancelling a project with too large, unfunded gap; and
4. Adopt financial parameters that "cap" the size of the unfunded gap left by inadequate toll receipts. Three approaches should be considered:

- Relate the cap to the overall size of the Modernization program or the typical share of the program allocated to the five ODOT regions. (This essentially makes filling the gap a regional problem).[3]
- Relate the gap to the overall size of the Development STIP or a typical regional share of the Development STIP (this would slightly reduce the 4-year funding constraint of the current STIP and enable moderately larger projects to be developed); or
- Relate the cap to some expected size (or portion) of an anticipated funding increase (state or federal). This approach enables the OTC to anticipate some program growth, primarily federal.

It should be noted that any or all of these approaches may require some form of concurrency from regional ACTs or MPOs as per adopted practice.

These procedures for STIP guidance would have several beneficial effects:

1. Local planners and project sponsors would not consume resources or energy on projects with very low likelihood of success;
2. The development of financial plans would require that local governments give attention to, and develop an understanding of, revenue sources and financial tools with which they may have previously been unfamiliar;
3. Greater transparency is provided to the public regarding ODOT's financial status and resultant program constraints; and
4. Local governments would develop a greater understanding of the need for parameters on tolling projects and, therefore, acquire a greater degree of "ownership" or responsibility for transportation financing in Oregon.

Section 6.0: Conclusions and Preliminary Recommendations

Tolling may not be a panacea for filling funding shortfalls and may not be appropriate in many instances in Oregon. In situations where it doesn't make sense to consider the use of tolling, criteria proposing conditions and minimum thresholds might lead decision-makers to remove tolling as a feasible alternative, thus making the discussion less cumbersome and "wishful." As policy discussions progress on tolling issues, some conditions and thresholds to consider include:

1. Tolling can be considered for appropriate types of project alternatives: modernization of a high-volume corridor, managed lane projects, extensions of state highways, and construction or reconstruction of major bridges.

2. A free alternate route may be critical to gaining public acceptance for tolling a facility. When tolls are being considered, the impact of a nearby free facility needs to be assessed. The negative aspect of the free route is the competition it poses for the tolled facility, and the potential for it to reduce the use of and revenue generated by the tolled facility. There

[3] For the 2012-2013 portion of the ODOT STIP, the "Equity Split" by region for 2012-2013 is: Region 1—37.56%, Region 2—28.76%, Region 3—15.09%, Region 4—10.31%, and Region 5—8.27%. The resulting 2013 targets are (in thousands): Region 1—$7,550, Region 2—$5,781, Region 3—$3,033, Region 4—$910 and Region 5—$1,238.

must be a balance between the use of the tolled facility and diversion of traffic onto the free alternate route.

3. Tolling could be removed as a funding option on facilities:
   - With daily volumes of less than 20,000 average daily traffic (ADT) (or perhaps even less than 60,000 ADT);
   - With little to no or moderate improvement in travel time savings;
   - With little to no or moderate relief to traffic congestion on adjacent or parallel facilities;
   - That are less than three miles from a free alternate route;
   - With no toll exemption for buses or no transit service gained as part of the project; and
   - With low to moderate revenue return on facilities with medium traffic volumes and low or medium proposed toll, or high traffic volumes and low proposed toll.

4. Tolling could be considered on facilities:
   - With daily volumes over 60,000 ADT;
   - With substantial improvement in travel time savings;
   - With a high level of reduction in traffic delays on parallel facilities;
   - That are one to three miles away from a free alternate route;
   - Where transit has toll exemption for buses and toll revenue can fund a high level of peak transit service gained as part of the project; and
   - Where revenue return is high with high traffic volumes and a medium or high proposed toll.

5. Public acceptance is critical to the success of implementing a tolling project. It is easiest to incorporate tolling if the interest is initiated locally.

6. Situations in Oregon where tolling could be appropriate include:
   - Applying tolls on existing facilities to accelerate capacity-adding projects;
   - Building a managed lane (HOT lane) facility in a highly congested area where toll pricing can be used to manage congestion along a corridor as well as provide revenue for a high-priority capacity need and also be consistent with regional and statewide planning goals;
   - Constructing a toll bypass facility on which traffic volumes are expected to be moderate or high (and not where volumes are expected to be low); and
   - Building a new access road to an airport, port, or other significant trip generator.

With the appropriate use of tolling in project funding considerations and assessment of tolling's feasibility in bridging a project funding gap, Oregon could find that tolling in some instances is a useful revenue and congestion management tool. Clear policies and parameters will help ODOT and its agency stakeholders in making these feasibility assessments up front, before significant time and energy has been spent on developing a project where tolling is not appropriate.

Regardless of their potential benefits, however, tolling projects are not developed in isolation of the rest of the state highway program. The non-toll generated portion of project costs must be considered in the context of the programming and funding policies of the Oregon Transportation Commission. This suggests a need for clearer policy guidance as that suggested above.

Glossary of Tolling Terms

Amortization – A financial term referring to terms of a loan where the provision is made in advance for the gradual reduction of an amount owed over time.

Area pricing – A tolling approach where vehicles are charged a fee to travel within a high activity center, such as a downtown or business district. Prices may vary by time of day to encourage motorists to enter the zone during less busy times or to use transit. An example is Fareless Square in Portland, where transit is available for free to discourage short-term and short-distance auto travel within the business district.

Bus rapid transit (BRT) – High-frequency bus service on dedicated lanes that are separate from general travel. BRT combines the advantages of rail transit – exclusive right-of-way to improve punctuality and frequency – with the advantages of a bus system – low implementation costs and flexibility to serve lower density areas.

Congestion pricing – An overarching term used to describe measures that reduce congestion by charging drivers tolls that vary by time of day or traffic volumes.

Consumer surplus – In economics, the difference between the price a consumer pays for an item and the price she would be willing to pay rather than do without it.

Cordon pricing – A pricing scheme where vehicles entering a high activity area are charged a fee when they cross the boundary line into the activity center. Motorists are charged each time they cross the cordon line. Prices could vary by time of day, to encourage motorists to enter the cordon zone during non-peak periods or to make peak trips using transit. This is similar to area pricing, distinguished by the toll being charged for crossing the cordon rather than for driving within the cordon zone.

Cost-benefit analysis (CBA) – An analytic technique used in determining the economic value of a project or plan. Costs and benefits are typically denominated in dollars and include the money, time, resources, and consequences associated with a project or activity.

Distance-based tolls – Fixed toll rates based on distance traveled and vehicle type.

Diversion – The result of people making different travel choices, in this case as a result of a toll. Diversion can refer to taking different routes, or changing modes, travel time or destination.

Dynamic congestion pricing – Tolls that change based on real-time travel conditions. For example, when traffic volumes go up, so do the tolls. Rates are lowered as demand eases.

Elasticity – The price elasticity of demand measures the nature and degree of the relationship between changes in quantity demanded of a good and changes in its price. High elasticity implies high sensitivity to changes in price while low elasticity, often referred to as inelasticity, means low sensitivity to price changes.

Electronic toll collection (ETC) – Using technology to collect tolls from drivers without requiring them to stop and make cash payments.

Equity – The idea that all travelers are of equal standing, and should be considered in the development of toll policy. Social, geographic and income equity are examples of equity issues that arise in toll policy development and implementation.

Express toll lanes – Limited access, normally barrier-separated highway lanes requiring drivers of all vehicles to pay tolls in order to use the facility. All tolls are collected electronically.

Fixed tolls – Toll rates that don't change. They are typically used to pay for the bridge or road on which they are charged. Trucks pay more than cars.

Fixed-schedule congestion pricing – Tolls charged at predetermined rates reflective of demand levels at different times of day; rates can be based on hour of the day, day of the week, direction of travel and vehicle type.

Gas tax – A state levied tax on the consumption of gasoline. The primary means currently of financing highways in Oregon.

Greenhouse gas emissions – The generation and emission of gases, such as carbon dioxide, methane, nitrous oxide and halocarbons, which accumulate in the atmosphere and have a long residence time, leading to a surface warming of the land and oceans.

High occupancy vehicle (HOV) – A vehicle containing more than one person.

High occupancy vehicle (HOV) lane - A travel lane restricted to transit and carpool vehicles meeting occupancy requirements of two or three people per car. HOV lanes are meant to carry more people in less space than general purpose lanes.

High occupancy toll (HOT) lanes – Travel lanes restricted to either qualifying HOVs or solo drivers willing to pay a toll. The toll typically varies by time of day or traffic levels and is collected electronically.

Investment grade – The top four rating categories for bonds. Important to tolling as special, independent analysis of the revenue generating capacity of a particular toll project may be required for bond issuance.

Managed toll lanes – Any toll lane that uses variably priced tolls to maintain superior, less congested travel conditions.

Mileage-based fee or mileage tax – A tax on vehicle use based upon miles driven rather than fuel consumption.

Non-recurrent delay – A type of travel delay that occurs because of incidents, and is therefore not as predictable as recurrent delay caused by traffic exceeding capacity, bottlenecks, other infrastructure problems.

Open road tolling – Use of electronic toll collection methods to keep traffic moving, as opposed to making people stop at toll booths to pay the toll.

Opportunity cost – In economics, the value of the next-highest-valued alternative use of a given resource.

Parking policies –Adopted means of managing access to a particular locale by changes in the price of parking.

Peak period – The busiest travel times of the day, also known as commute time or rush hour. There are typical two peak periods each weekday – the morning and afternoon commute times.

Public-Private Partnerships (PPPs) – Contractual agreements formed between a public agency and private sector entity, which expand on the traditional private sector role in the delivery of transportation projects. PPPs are particularly prevalent for tolling projects.

Pricing – A tolling concept where the level of toll (price) is used to change travel behavior.

Public good – In economics, a good that is non-rival and non-excludable. This means consumption of the good by one individual does not reduce the amount of the good available for consumption by others and no one can be effectively excluded. A non-congested public highway can be considered a public good.

Recurrent delay – A type of highway delay that occurs regularly due to too much traffic and/or geometric constraints.

Single occupancy vehicle (SOV) – A vehicle containing only one occupant.

State Infrastructure Bank (SIB) – An ODOT-managed revolving loan fund available for transportation projects.

System-wide tolling – Implementing tolls on highways and major arterials to reduce congestion, minimize route diversion and increase transportation revenues.

Theory of the Second Best – In economics, a theory of what happens when one or more optimality conditions are not satisfied in an economic model. It implies the need to study the details of a situation prior to assuming theory based conclusions because improvements in market performance in one area may not mean an overall improvement. This is significant in congestion pricing schemes where theoretically optimal conditions are likely to be unachievable.

Time-of-day pricing – A tolling approach that varies by the time of day in order reduce congestion at peak hours; rates are higher at peak hours then at off-peak.

Tolling – Charging a price to use a road, bridge or tunnel.

Toll Revenue Bonds – A type of municipal bond where the principal and interest are secured by tolls paid by the users of the facility that is built with the proceeds of the bond issue.

Travel-demand forecasting – The analytical estimation of future travel volumes and patterns, typically performed with computer models. There are four basic components: (1) trip generation – predicting the number of trips that will be made; (2) trip distribution – determining where the trips will go; (3) Mode usage – how the trips will be divided among available modes of travel; and (4) Trip assignment – predicting which routes the trips will take, resulting in highway system and transit ridership forecasts.

Travel demand management – The application of techniques that affect when, how, where, and how much we travel done in a purposeful manner by government or other organizations. The techniques include education, policies, regulations or other combinations of incentives and disincentives.

Truck only toll (TOT) lanes – Limited access, normally barrier-separated toll lanes available only to trucks for a variably priced toll. All tolls are collected electronically.

Value of time – One of the most important benefits of road pricing, as well as other transportation projects, is travel time savings. What these savings are worth to motorists can vary by income, gender, age, trip purpose, mode used, length of trip, uncertainty of travel time and other factors. This in turn implies analytical difficulties in applying values to given situations.

Value pricing – Toll rates that vary in direct proportion to travel demand or congestion on alternative free routes.

Variable toll – A toll that changes by time of day, traffic volumes or other factor.