

**OREGON TRANSPORTATION PLAN UPDATE**  
**Sustainable Transportation and Sustainable Development**

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# OREGON TRANSPORTATION PLAN

## Background Paper

### Sustainable Transportation and Sustainable Development

#### INTRODUCTION

A key component of the update to the Oregon Transportation Plan (OTP) is to assess the current goals and policies to determine how well they address existing conditions, forecasted trends and recent policy changes. This paper provides background for updating the Oregon Transportation Plan to include policies that address sustainability. Currently, sustainability is not addressed directly in the OTP although there are several policies that support sustainable practices. This paper addresses the motivations for sustainable practices, outlines practices in the Oregon Department of Transportation, Oregon, the United States and Europe, and makes policy recommendations for the OTP update.

#### What is Sustainability

Sustainability is creating a balance between the economy, social needs, and the environment in order to ensure healthy and equitable lifestyles and resources for future human, plant and animal communities. ORS 184.421 defines sustainability as follows:

*“Sustainability” means using, developing and protecting resources in a manner that enables people to meet current needs and provides that future generations can also meet future needs, from the joint perspective of environment, economic and community objectives.*

Sustainability puts equal emphasis on environmental quality, economic health and social equity. Economic and social development should not harm the environment within a global context and, if possible, should improve it. Sustainable economics maintains a distinction between “growth” (increased quantity) and development (increased quality), the notion of quality over quantity.<sup>1</sup>

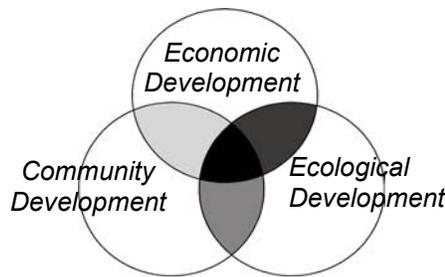
Put another way, natural capital, social capital and economic capital are three interdependent forms of community wealth. Natural capital includes both nonrenewable resources (such as petroleum and coal) and renewable resources (such as wood and solar power). Social capital includes all of the human contributions and involves social equity; all people have the right to equitable return for their work, adequate food and shelter, and a healthy community. Economic capital is not based on the growth in dollar value of goods and services, as the Gross National Product is, but is premised on the provision of needed goods and services for healthy human and natural communities. Goods and services may be provided without the exchange of monetary resources. All of the impacts of the provision of these goods and services should be accounted for, including the costs to the environment and society, and the costs that are subsidized through taxes or other transfers.

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<sup>1</sup> Herman Daley and John Cobb, *For the Common Good*, Beacon (Boston) 1989.

“Sustainability planning is to development what preventive medicine is to health: it anticipates and manages problems rather than waiting for crises to develop. Sustainable development strives for an optimal balance between economic, social, and ecological objectives.”<sup>2</sup>

The sustainability movement grew out of the environmental movement, heralded with the first Earth Day in 1972. Initial concerns were about pollution, the depletion of natural resources, recycling of materials, and the increased use and development of renewable resources, such as solar energy. These concerns expanded to include global warming, which gained public attention around 1988. In 1983, the United Nations published *Our Common Future* known as the Brundtland Report. In 1992, the Earth Summit in Rio de Janeiro placed the environment on the global economic agenda. The concept of integrating economic development, community livability, and ecology has become the foundation for sustainable development and sustainable transportation.<sup>3</sup>



*Transportation investments represent an important opportunity to leverage investments that achieve multiple objectives at one time.*

Issues related to sustainability are organized by economic, social, and environmental considerations as shown in Tables 1 and 2 below.

**Table 1: Sustainability Issues**

<i><b>Economic</b></i>	<i><b>Social</b></i>	<i><b>Environmental</b></i>
<i>affordability</i>	<i>equity</i>	<i>pollution prevention</i>
<i>resource efficiency</i>	<i>human health</i>	<i>climate protection</i>
<i>cost internalization</i>	<i>education</i>	<i>biodiversity</i>
<i>trade and business activity</i>	<i>community</i>	<i>precautionary action</i>
<i>employment</i>	<i>quality of life</i>	<i>avoidance of irreversibility</i>
<i>productivity</i>	<i>public participation</i>	<i>habitat preservation</i>
<i>tax burden</i>		<i>aesthetics</i>

Source: Victoria Transport Policy Institute

<sup>2</sup> Todd Litman and David Burwell, *Issues in Sustainable Transportation*, Victoria Transport Policy Institute, February 2003, p. 1.

<sup>3</sup> Newman and Kenworthy, *Sustainability and Cities*, Island Press, 1999.

In 2000, Governor Kitzhaber issued an Executive Order on Sustainability that initiated actions for state agencies. In 2001, the Oregon State Legislature signed the Sustainability Act into law. The objectives are listed in Table 2. The Act established a Sustainability Board and initiated a number of innovations in state agencies, including work groups made up of representatives of private industry, organizations and government agencies to research and recommend purchasing and energy policies to be implemented by state agencies. In addition, state agencies began their own review of activities and began to implement changes to support sustainability.

One part of the Act addressed the state’s policies to assist local communities, requiring that “state agencies shall seek to enable and encourage local communities to achieve the following objectives,” which are listed in Table 2 below.

**Table 2: Community Objectives under ORS 184.423 (2)**

<i><b>Economic</b></i>	<i><b>Community</b></i>	<i><b>Environmental</b></i>
<i>Resilient local economies that provide a diversity of economic opportunities for all citizens.</i>	<i>An independent and productive citizenry.</i>	<i>Healthy urban and rural watersheds, including habitats for fish and wildlife.</i>
<i>Workers supported by lifelong education to ensure a globally competitive workforce.</i>	<i>Youth supported by strong families and communities.</i>	<i>Clean and sufficient water for all uses.</i>
	<i>Downtowns and main street communities that are active and vital.</i>	<i>Efficient use and reuse of resources, and minimization of harmful emissions to the environment.</i>
	<i>Development that wisely and efficiently uses infrastructure investments and natural resources.</i>	
	<i>Affordable housing available for citizens in community centers.</i>	

These sustainable community objectives were implemented first through Community Solutions, a network of state agency and local partner teams throughout the state. The Oregon Solutions Network was then created to move this activity beyond state agency actions. A non-profit organization now associated with Portland State University, Oregon Solutions creates public-private partnerships to carry out the community objectives through specific projects.

**Transportation Sustainability**

Under an ideal sustainable transportation approach, highways would function safely and efficiently with fuel-efficient vehicles occupied by multiple passengers. Public transit systems would be comfortable with frequent and reliable schedules that are well integrated with land

uses so that lengthy trips are needed less frequently to meet people’s needs. Bicycling, walking and public transit alternatives would reduce road congestion, increasing the capacity for highway truck movement with just-in-time delivery schedules. Much of the movement of freight would now use rail cars powered by fuel-efficient and low-polluting engines. Both freight and passenger rail would have few schedule delays due to upgraded railroad crossings, passing facilities, and loading and unloading facilities. Aviation and marine services would be seamlessly integrated with other modes of travel making the movement of passengers and goods safe and efficient. All of this would be accomplished within the economic means of the community and would be sited, constructed and operated without adversely impacting the communities they are intended to serve. That is, all three circles in the sustainability diagram above would be integrated and balanced. Table 3 summarizes the key issues that would be balanced and integrated. Other cultural changes would reduce some of the need for freight transport and commuting as communities developed economies that provided many of these resources locally. The goal is no longer focused on moving people and goods, but looks at the larger picture of the most sustainable way to provide for people’s needs.

**Table 3: Transportation Sustainability Issues**

<i>Economic</i>	<i>Social</i>	<i>Environmental</i>
<i>traffic congestion</i>	<i>inequity of impacts</i>	<i>air pollution</i>
<i>mobility barriers</i>	<i>mobility of disadvantaged</i>	<i>climate change</i>
<i>crash damage</i>	<i>human health impact</i>	<i>habitat loss</i>
<i>transportation facility costs</i>	<i>community cohesion</i>	<i>water pollution</i>
<i>consumer transportation costs</i>	<i>community livability</i>	<i>hydrologic impacts</i>
<i>depletion of non-renewable resources</i>	<i>aesthetics</i>	<i>noise pollution</i>

Source: Victoria Transport Policy Institute

**Motivations for Sustainable Development and Sustainable Transportation**

The primary motivation for sustainable development and sustainable transportation is to create a system that avoids resource depletion, avoids adverse impacts to the environment and society, and is affordable. One of the major issues is the need to reduce carbon loading of the atmosphere and the impact of the greenhouse effect, thereby decreasing what are predicted to be catastrophic global consequences. These consequences include changes in precipitation patterns with disruptions in other natural systems and an increase in frequency and violence of storms.<sup>4</sup> Changes could occur so rapidly that natural and social systems would not easily adapt. We are already seeing the extinction of some plant and animal species whose habitat conditions have changed.

Another significant issue is the growing awareness that natural capital (resources) is limited. The lack of equitable access to and use of natural resources is also a fundamental issue.

<sup>4</sup> Elizabeth Deakin, “U.S. Dilemmas and European Experiences,” *Sustainability and Environmental Concerns in Transportation* 2002, Transportation Research Board, p. 3.

Petroleum resources are increasingly scarce and costly as the nation makes a slow transition to other fuels.

Growing frustration over the amount of congestion and sprawl and its impact on livability is also contributing to the sustainability movement. Total hours of congestion delay in U.S. metropolitan areas have roughly tripled since 1980 because many areas of the nation have shifted away from public transit, walking, and carpooling to single-occupant auto use. Private vehicle use has increased. Transit trends in Oregon tend to be better than in many other states due largely to the investment made in light rail in the Portland metropolitan area. People's desire for communities that are less auto dependent and that promote personal health is increasing in Oregon and throughout the nation. Many Americans are also expressing a growing concern about a loss of sense of place and community.<sup>5</sup>

### **Worldwide Ecological Trends Related to Transportation Trends**

One of the major indicators that the earth's resources are not being used sustainably is the fact that human activities are increasing the atmospheric concentrations of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and various halocarbons (HCFCs), and, until very recently, chlorofluorocarbons (CFCs). These gases are collectively referred to as greenhouse gases because of their warming influence on the climate. The concentration of carbon dioxide, a key greenhouse gas, has increased 30 percent in the atmosphere since industrialization. The earth has warmed by more than 1 degree Fahrenheit over the last century. The nine warmest years in the last century occurred in the 1980's and 1990's.<sup>6</sup> Experts predict that the earth will see a faster rate of climate change in the next 100 years than any experienced during the last 10,000 years.<sup>7</sup>

The U.S. is the largest energy user in the world and the largest emitter of greenhouse gases, primarily CO<sub>2</sub>. The greenhouse gas emissions from the United States currently account for almost one-quarter of the worldwide total. Transportation activities in the United States are estimated to be the largest single source of greenhouse gas emissions and are responsible for over half of the nation's air pollution as well. Transportation-generated greenhouse gases are primarily carbon dioxide with some nitrous oxide emissions.

In addition to greenhouse gases, transportation is responsible for many of the emissions of criteria pollutants that lead to immediate air quality problems, such as high ozone levels and smog. These pollutants include carbon monoxide, volatile organic compounds, particulate matter and nitrogen oxides. Motor vehicles are responsible for 60 percent of carbon monoxide emissions in the U.S. The reductions in pollution from carbon monoxide, volatile organic compounds, and nitrogen oxides from cleaner engines have been offset by the huge increase in vehicle miles traveled. The U.S. transportation CO<sub>2</sub> emissions are expected to double by the middle of the next century unless technological changes are vigorously introduced or demand

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<sup>5</sup> Tony Hiss, "The Experience of Place," 1990.

<sup>6</sup> J. T. Houghton et al, "Climate Change 2001: The Scientific Basis, [Summary for Policymakers](http://www.ipcc.ch/United Nations Intergovernmental Panel on Climate Change)," Report of Working Group I, Cambridge Univ. Press, Cambridge UK, 2001. <http://www.ipcc.ch/United Nations Intergovernmental Panel on Climate Change>,

<sup>7</sup> Ibid.

is sharply curbed. On a hopeful note, public transportation generates one-half the carbon monoxide, volatile organic compounds, carbon dioxide and nitrogen oxide per passenger mile as the private auto.<sup>8</sup>

Global warming presents a number of challenges to the transportation system. “Mid-range projections suggest that the relatively slow rate of the rise of the sea level this century (about 4 to 10 inches, reduced or amplified by regional changes) may increase by a factor of 3.”<sup>9</sup> The predicted severe weather and increased flooding may have an effect on transportation and the distribution of goods and services. “Warmer temperatures will also reduce combustion efficiency of airplanes, which would both increase costs and require longer runways or a lower load for aircraft.”<sup>10</sup>

### **Oregon Ecological Trends Related to Transportation Impacts**

Transportation is Oregon’s single largest contributor to poor air quality.<sup>11</sup> Oregon faces a 32 percent increase in CO<sub>2</sub> emissions between 1990 and 2015.<sup>12</sup> Even with carbon dioxide increases, however, Oregon’s air meets the U.S. Environmental Protection Agency’s minimum standards for human health nearly 100 percent of the time. The carbon dioxide produced by burning gasoline makes up about one-quarter of the northwest region’s total climate-changing emissions.<sup>13</sup> In Oregon, there are 3.1 million motor vehicles registered for roadway use. Oregonians drive more than 31 billion miles and spend more than \$2 billion for transportation fuels each year. This represents 27 percent of Oregon’s energy use.<sup>14</sup>

Sprawling land development is another trend in both the U.S. and in Oregon that threatens sustainability. In Oregon, the land development patterns are less sprawled than other parts of the country due to urban growth boundaries (UGBs). Often development characterized as “sprawl” in Oregon is occurring at communities’ edges and typically is within the UGB. According to the Census, the statewide average travel time to work in Oregon was 20.6 minutes in 1990, and 21.4 minutes in 2000.<sup>15</sup> The average travel time in the Portland CMSA<sup>16</sup> increased from 21.7 minutes in 1990 to 24.4 minutes in 2000.<sup>17</sup> Increased travel time means increased fuel use and often increased roadway congestion.

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<sup>8</sup> Ibid.

<sup>9</sup> Michael C. MacCracken, “Global Warming: A Science Overview,” *Global Climate Change and Transportation, Coming to Terms*, ENO Transportation Foundation, 2002, p. 10.

<sup>10</sup> Ibid.

<sup>11</sup> Oregon Department of Energy web site, May 2003, : <http://www.energy.state.or.us/trans/altfuels.htm>

<sup>12</sup> Oregon Department of Energy, *Report on Reducing Oregon's Greenhouse Gas Emissions*, <http://www.energy.state.or.us/climate/gggas.htm>

<sup>13</sup> Oregon Department of Energy, May 2003,

<http://www.energy.state.or.us/trans/transhm.htm#Commuter%20Pool%20Vehicles>:

<sup>14</sup> Ibid.

<sup>15</sup> Nancy A. McGuckin and Nanda Srinivasan, *Journey to Work Trends in the United States and its Major Metropolitan Areas, 1960-2000*, U.S. Department of Transportation, Federal Highway Administration (FHWA-EP-03-058), June 30, 2003.

<sup>16</sup> Consolidated Metropolitan Statistical Area. This includes Multnomah, Washington, Clackamas, Columbia, Yamhill, Polk and Marion Counties in Oregon and Clark County Washington.

<sup>17</sup> Nancy A. McGuckin and Nanda Srinivasan

Transportation is a source of non-point water pollution. Paved roads and parking lots, for example, are impervious surfaces. Storm water that falls on these surfaces picks up chemicals and pollutants and deposits them into open bodies of water. ODOT is implementing best management practices for stormwater in order to reduce water quality impacts from state highways, bridges and other facilities. Transportation-related pollution prevention practices and improved stormwater management appear to be effective, since water quality in streams has continued to improve during the past decade.

### **Economic Implications**

While a lot of emphasis has been put on environmental degradation, sustainability requires a balance of these concerns with the issues of a healthy economy. Until recently, most economists have assumed that whatever its social and environmental costs, increased transport provides significant economic benefits. New research indicates that increased road capacity and motor vehicle use may have negative as well as positive impacts. The marginal productivity of increased transportation is declining. In addition, vehicle use imposes external costs that can offset direct economic gains.<sup>18</sup> This recognition supports the need for strategies that achieve economic, social and environmental objectives rather than one objective being traded-off for another. The economic benefits provided by the transportation system are integral to the access to work, mobility for freight, and connectivity between communities that the transportation system provides. These goals can be achieved in a number of ways in addition to expanding highways. Achieving a balanced multimodal system is a major goal of the Oregon Transportation Plan.

The United States' dependence on petroleum products is an economic issue. In Oregon, petroleum products are imported, and more than 80 percent of the petroleum is used for transportation.<sup>19</sup> As the instability in the world oil market continues, the United States' interest in alternative fuels may increase. However, lack of an U.S. national policy is a barrier to transitioning to sustainable fuels and achieving transportation sustainability.

## **OREGON SUSTAINABILITY POLICY FRAMEWORK**

The State of Oregon has policies that directly support sustainable practices. The major policy areas are embodied in the Sustainability Act, the Executive Orders on Sustainability by Governor Kitzhaber and Governor Kulongoski, Oregon's land use program, the Oregon Benchmarks, and the Oregon Department of Energy's policies.

### **Governor's Executive Order on Sustainability**

Governor Kitzhaber was the first governor in the U.S. to issue an Executive Order (EO) on sustainability. Governor Kulongoski followed with an EO in 2003 (Appendix A). Other states

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<sup>18</sup> Marlon Boarnet, "New Highways and Economic Productivity: Interpreting Recent Evidence," *Journal of Planning Literature*, Vol. 11, No. 4, May 1997, pp.476-486; Amy Helling, *Transportation and Economic Development; A Review, Public Works Management and Policy*, Vol. 2, No. 1, July 1997, pp. 79-93.

<sup>19</sup> Oregon Department of Energy, 2003 website.

have since developed similar policies including New York, Delaware, and New Jersey, although none are as far reaching as the Oregon Executive Orders. The Legislature codified much of the Kitzhaber EO into statute in 2001 in an act known as the Sustainability Act. This Act created the Sustainability Board, which oversees implementation of the statute.

Governor Kulongoski's Executive Order 03-03, a Sustainable Oregon for the 21<sup>st</sup> Century, encompasses sustainable practices that are being promoted within the state. The Executive Order seeks to embed sustainable development into Oregon's economic, social and environmental policies and to turn these concepts into measurable actions.<sup>20</sup> Agency work to date has focused primarily on adjusting internal operations to reduce waste, save energy, and purchase more sustainable products. ODOT has also taken a number of actions to reduce motor carrier emissions, increase the use of the internet for business transactions, and reduce environmental contamination. These activities are described in the ODOT Sustainability Plan and prior reports on sustainability actions taken under the Sustainability Act.

Under Executive Order 03-03, ODOT has developed a Sustainability Plan. The draft plan, not yet approved by the Sustainability Board, includes the following ODOT major actions:

- *Implement Oregon Transportation Investment Act III Bridge Replacement Program construction projects in a sustainable manner.*
- *Develop an ODOT Maintenance Environmental Management System (EMS).*
- *Renew the vision of a balanced, multimodal transportation system that includes sustainability considerations in the update of the Oregon Transportation Plan.*

In addition, ODOT Divisions have identified a number of other actions that are already underway or are planned.

### **Oregon Benchmarks**

The goals of the Oregon Benchmarks are three-fold and mirror the sustainability concept of economy, community and environment: 1) quality of jobs for all Oregonians; 2) safe, caring and engaged communities; and 3) healthy, sustainable surroundings. A recent re-examination of what it will take to affect certain trends has led the state to identify new and more specific actions.

Oregon Benchmarks currently track the following sustainability indicators related to transportation:

- Percent of Oregonians commuting less than 30 minutes.
- Percent of Oregonians commuting by non single occupant vehicle mode.
- Percent of Oregonians living in communities with daily intercity service.
- Percent of urban state and local highways with bicycle lanes and sidewalks.
- Annual VMT per capita in metropolitan areas.

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<sup>20</sup> <http://www.oregonsolutions.com>

## **Oregon Department of Energy**

The Oregon Department of Energy has a number of programs that support sustainability and is developing a new climate change policy that will consider more aggressive actions.<sup>21</sup>

Strategies to reduce transportation emissions are key to creating reductions. Current programs include alternative fuel car infrastructure support (e.g., supporting the creation of a network of alternative fuel and maintenance stations), information and education, and tax credits. The Department of Energy promotes alternatives to gasoline and diesel to help meet the objectives of cleaner air, reducing demand on foreign petroleum and diversity of transportation fuel. The alternative fuels (identified in federal mandate legislation) are ethanol, methanol, electricity, compressed natural gas, liquefied natural gas, liquefied petroleum gas, bio-diesel, hydrogen, or hybrid vehicles using a number of fuels. Many of these transportation fuels burn cleaner, come from renewable sources, and originate in North America. The Department of Energy helps support two alternative fuel coalitions that serve communities in the Willamette and Rogue Valleys by providing technical information, promoting alternative fuel use and helping members reduce the cost of new fueling systems.

## **Oregon Statewide Land Use Program**

The state land use program is the state's framework for growth management, a key measure to achieving sustainable communities. The program promotes orderly growth through comprehensive planning, urban growth boundaries, and other provisions to encourage compact growth. As a result of the 30-year old program, Oregon is generally more compact than other states. For example, between 1982 and 1997 the U.S. population grew by 17 percent but the amount of urbanized land grew by 47 percent. Between 1992 and 1997, Georgia urbanized 1.62 acres for each new resident; Florida urbanized 1.25 acres; and Oregon urbanized 0.56 acre per new resident.<sup>22</sup>

Oregon's land use program Goal 12, Transportation, and the Transportation Planning Rule require that local, regional, and state transportation system plans are developed to "*avoid principal reliance upon any one mode of transportation.*"<sup>23</sup> Goal 12 Guidelines state that "*...high density developments with concentrated trip origins and destinations should be designed to principally be served by mass transit and that low density areas will be principally served by the auto.*" More specifically, Goal 12 Transportation Planning Rule requires transportation system plans to be designed to achieve specified vehicle mile reductions per capita within MPO areas.<sup>24</sup> As a result of this policy framework, Oregon is a leader in providing public transit within the Metropolitan Planning Organization areas.

## **Oregon Transportation Plan Policy**

The Oregon Transportation Plan Goals and Policies support a sustainable transportation system with the OTP's vision of an efficient transportation system through Goal 1. There are currently

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<sup>21</sup> A new climate change policy is being developed by the Governor's Advisory Group on Global Warming.

<sup>22</sup> Arthur Nelson, Lincoln Institute of Land Policy.

<sup>23</sup> Oregon Statewide Planning Goal 12, OAR 660-015-0000(12).

<sup>24</sup> OAR 660-012-0035.

no goals or policies that use the term “sustainability.” However, policies that support sustainability are:

- Balanced Transportation System (Policy 1A)
- Environmental Responsibility (Policy 1D)
- Efficiency (Policy 1B)

Additional policies that relate to sustainable practices and strategies are referenced by topic in the sections below.

**Policy 1B, Efficiency** is the policy that probably speaks most directly to sustainability. It states:

*It is the policy of the State of Oregon to assure provision of an efficient transportation system. The system is efficient when (1) it is fast and economic for the user; (2) users face prices that reflect the full costs of their transportation choices; and (3) transportation investment decisions maximize the full benefits of the system. (Full benefits and costs include social and environmental impacts, as well as the benefits of mobility to users, and construction, operations and maintenance costs.)*

#### **Action 1B.1**

*Employ economic, social, energy and environmental impacts as a part of the transportation planning and project design process. This should be done on a total system basis rather than optimizing the cost effectiveness of one mode at the expense of another.*

Including the costs of “social and environmental impacts” are key to integrating community, environmental and economic values. However, methods to measure the “full benefits and costs” of social and environmental impacts are not currently fully in place. Identifying the appropriate measures and timeframes to move this forward is challenging. **Policy 4G, Management Practices, Action 4G** gives some guidance: *Consider the use of life-cycle costs in the design and engineering of bridges, tunnels and pavement.* In order to establish sound “sustainability” policies and practices, externalities (social and environmental costs) will need to be applied to more aspects of the transportation system. Under a sustainability agenda, life cycle cost analyses would be more broadly applied. The current bridge replacement program is addressing these issues and will provide valuable feedback on future actions for ODOT.

#### **ODOT Sustainability Practices in Place**

ODOT has a number of sustainability practices in place. The agency has had a long history of supporting reuse, recycling and resource efficiency. Other actions were motivated by increasing efficiency, cutting costs, and improving customer service. With the Governor’s EO, attention is being given to additional practices that can be put in place (Appendix A, page G-25). Many of the current ODOT practices that promote sustainability are listed in Appendix B.

## SUSTAINABLE TRANSPORTATION PRACTICES AND STRATEGIES

The Transportation Research Board (TRB), which is a federally funded national research group, the Victoria Transport Policy Institute and others have researched transportation practices that contribute to sustainable development and a sustainable transportation system. A number of practices found to be effective are listed below with a brief description of how the practice or strategy is being carried out in Oregon and the related Oregon Transportation Plan policy. A full list of European practices researched by the Transportation Research Board is shown in Appendix C.<sup>25</sup>

### Land Use Strategies

The most beneficial land use strategy is people living close to work, shopping and basic services. Providing public transit and convenient and hospitable walking and biking facilities are the next best actions. Urban growth boundaries, comprehensive planning, minimum density development requirements, and transportation investments that encourage center-focused development are effective land use strategies that reinforce sustainable transportation. Oregon is a leader in land use planning and has more communities with compact development characteristics than many places in the country. This is largely due to the statewide land use program that has been in place for over 30 years.

### OTP Land Use Policy

***Oregon Transportation Plan Policy 2A, Land Use*** states: *It is the policy of the State of Oregon to develop transportation plans and policies that implement Oregon's Statewide Planning Goals, as adopted by the Land Conservation and Development Commission.*

***Action 2A.1:*** *Support local land use planning with system plans that implement this policy, with the objective of providing the needed level of mobility while minimizing automobile miles traveled and number of automobile trips taken per capita.*

The Elizabeth Deakin, a Transportation Research Board researcher, estimates that land use planning strategies and aggressive demand management will achieve a six-percent national reduction in greenhouse gas by 2020 and 15 percent by 2040.<sup>26</sup> Travel distance to basic services and land utilization rates are indicators of transportation sustainability.

### Location-Efficient Mortgages

To reinforce and support centrally located housing, Location-Efficient Mortgages (LEMs) are being tested and promoted in parts of the U.S. LEMs allow lenders to increase the amount of mortgage (or home) for which a potential purchaser may qualify based on the lower transportation costs of potential homebuyers and homes located near public transit services. Location Efficient Mortgages are targeted for communities where residents can walk or bike from their homes to services and public transportation. The State of California identifies LEMs

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<sup>25</sup> Elizabeth Deakin, p. 8.

<sup>26</sup> Ibid.

as a major transportation policy and strategy to reduce travel demand and to expand the number of families qualifying for mortgages. Location Efficient Mortgages are being tested in Seattle, Chicago, and Los Angeles. In Chicago, the lowered transportation costs create savings estimated to range between \$350-\$650 per month due to the availability of services and alternative transportation. No policy currently exists that explicitly supports LEMs in Oregon.

### Promote Biking and Walking as a Travel Mode

Walking and bicycling are inherently sustainable forms of transportation because they use the least energy per kilo of weight moved. By comparison, less than 2 percent of the energy consumed in an auto is used to move the passengers. The rest is used to move the vehicle or is lost in braking, exhaust and heat.<sup>27</sup> Walking offers a combination of access, mobility, low energy use and healthy exercise.

While Oregon has a dedicated funding source for bicycle and pedestrian improvements, unlike most states, many streets in Oregon lack sidewalks and bike lanes. The streets are often difficult to cross. Retrofitting existing state and local street networks to accommodate bicyclists and pedestrians is a major and important challenge. During the interviews conducted for the update of the Oregon Transportation Plan, interviewees expressed about the need for sidewalks systems to be completed within the core sections of Oregon communities. Many feel complete pedestrian networks have economic, social and environmental benefits.

Designing for autos tends to segregate land uses, increase travel distances, reduce street connectivity and result in wide and busy urban arterial streets with high-speed traffic. The trade-offs are not always clearly made. Decision-making processes that give greater weight to bicycle and/or pedestrian movement is needed. Steps that can be taken include:

- Creating streets that are safer for pedestrians and bicyclists.
- Improving street connectivity.
- Limiting sprawl-inducing land uses.
- Limiting the number of lanes on highways and city streets to reduce crossing distance and to create an environment that is more in scale with pedestrians.
- Building quality facilities, including trail networks that are away from the air pollution and noise of busy highways.

### OTP Bicycle and Pedestrian Policy

**Policy 2D – Facilities for Pedestrians and Bicyclists** states: “It is the policy of the State of Oregon to promote safe, comfortable travel for pedestrians and bicyclists along travel corridors and within existing communities and new developments”. **Action 2D.1** states: *Make walkways, pedestrian shelters and bikeways an integral part of the circulation pattern within and between communities to enhance safe interactions between motor vehicles and pedestrians and bicyclists, using techniques such as:*

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<sup>27</sup> Hawken and Lovins, *Natural Capitalism*, page 24.

- *Renovating arterials and major collectors with bike lanes and walkways and designing intersections to encourage bicycling and walking for commuting and local travel.*
- *Developing all transit centers near residential areas to be safely and expeditiously accessible to pedestrians and bicyclists.*

## **Technology**

Technology offers many opportunities to increase efficiencies in goods and passenger movement including the ability to access information. Information includes weather, scheduling, location, and facility information. Transportation-related technology trends and benefits are outlined in *Technology in Transportation*, another Oregon Transportation Plan update background paper. Oregon has a number of integrated, intelligent transportation system (ITS) programs that provide traveler information and improve safety, operations, and maintenance.

Global positioning systems are being installed in public transit bus fleets and passenger rail systems to give real time information to operators and riders. Electronic charging devices are increasingly available, making it more feasible to connect users with different transportation systems and charge for the transportation services on a usage basis. An Oregon example is work initiated by the Road User Fee Task Force.<sup>28</sup> They have determined that with available technology, a pricing system based on a mileage fee is practical and can be feasibly implemented by buses, trains and other transit systems and automobiles. Pricing the transportation system is a method to reflect social and environmental costs and provide incentives for choosing alternative modes.

## **Mode Specific Technologies**

The Green Goat™ is a hybrid railroad car switcher used in rail yards that has electric traction motors on axles powered by acid batteries. The batteries are kept charged by a small generator driven by a diesel-fueled prime mover. It is estimated that the Green Goat™ has a capital cost savings of around 30 percent, with a 90 percent reduction in nitrous oxides and a similar reduction in cancer-linked particulate matter.<sup>29</sup>

## **Pricing Strategies**

Pricing programs are recognized methods of reducing congestion. Methods vary from toll roads to peak period congestion pricing.

## **Congestion Pricing**

Congestion pricing charges the owner or operator of a motor vehicle a fee for using certain roadways during periods of high congestion. Congestion pricing is typically applied on a geographic basis to heavily congested roads. The way in which congestion pricing is

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<sup>28</sup> <http://www.odot.state.or.us/ruftf/>

<sup>29</sup> <http://www.railpower.com/greengoat.php>

implemented depends upon the type of technology selected and the type of pricing preferred by policymakers. Oregon has no toll roads and only two toll bridges. Variable tolls on urban highways reduce and spread out demand.

### Alternative Fuel Revenue Tax

The Oregon Road User Fee Task Force has prepared a report that makes a case for a new system of revenue collection for the state's roads and highways. The report proposes alternative revenue mechanisms including a fee on vehicle miles traveled within Oregon; congestion pricing, and new facility tolling. Moving these mechanisms forward would promote a more sustainable transportation system while also creating alternative revenue resources.<sup>30</sup> These fees also support the policy of reflecting the true costs of the transportation system by providing user support for highways based on usage rather than a flat rate.

### Fuel Pricing Strategies

Increased fuel cost can help promote alternative modes and investments. Elizabeth Deakin, in research for the Transportation Research Board, estimates that increasing fuel prices by a rate of 3 percent per year would result in a 20 percent reduction in global warming by 2020 and 35 percent reduction by 2040.<sup>31</sup>

### Incentives to Buy Efficient Vehicles

The State of Oregon provides a tax credit incentive of up to \$1,500 to encourage Oregonians to purchase alternative fuel vehicles. The tax credits are a dollar-for-dollar credit against State of Oregon income taxes. The Transportation Research Board estimates that a 1.5 percent annual increase in average new vehicle fuel efficiency (through the introduction of new low-emission vehicles) would result in a 15 to 20 percent reduction in global warming by 2020 and 35 percent by 2040 (5 percent of fleet by 2020 and 40 percent by 2040).<sup>32</sup>

### Carbon Taxes

Carbon taxes, an excise tax on fossil fuels, is considered a motivator for automakers to invest in alternative technology more aggressively. Minnesota estimated that a \$50 per ton tax on carbon would raise the price of gasoline by 15 cents per gallon and the price of coal-fired electricity (which accounts for 60 percent of Minnesota's overall electricity) by about 1.5 cents per kilowatt-hour. It is estimated that 90 million tons of carbon dioxide were generated per year in 1998 in the State of Minnesota and that one pound of carbon, if burned, generated 3.67 pounds of carbon dioxide. A \$50 per ton tax on carbon emissions translates into about a \$14 per ton tax on carbon dioxide emissions. One key to using this tax to change consumer preferences would be for this tax to be visible to the consumer. A sports utility vehicle price that is increased by a carbon tax that reflects its rate of emissions should be an informational item for the purchaser.

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<sup>30</sup> <http://www.odot.state.or.us/ruff/>

<sup>31</sup> Elizabeth Deakin, p. 5.

<sup>32</sup> Ibid.

## Distance-Based Car Insurance and Registration Fees

Distance-based car insurance and distance-based car registration fees convert insurance and registration fees to a variable cost related to annual miles driven. A national system of mileage-based automobile insurance is estimated to reduce driving by about 9 percent.<sup>33</sup> This could also reduce travel during peak hours motivated by consumer savings resulting from the lower, off-peak charges. The 2003 Legislature passed HB 2043 which provides a limited tax credit to companies that offer per-mile insurance premiums to customers in Oregon. Support for this promotes the policy that vehicle owners should pay the full costs of their driving choices. This system relates the amount of driving directly to the cost, and provides an incentive to reduce vehicle miles traveled.

## Car-Sharing Programs

Car-sharing programs provide a form of short-term auto rental. A relatively new car-sharing program exists in Portland with about 600 members and a 29-car fleet. Car-sharing is also available in Eugene, Corvallis, Bend, and Salem. Users pay by the hour with some mileage limits and have reciprocal services in Seattle, San Francisco and Los Angeles. The company pays for gas, insurance and maintenance. In Europe, it is estimated that one shared car keeps six off the road.

## OTP Pricing Related Policies

**Oregon Transportation Plan Policy 4G – Management Practices** and the associated actions identify congestion pricing as an efficient transportation system management tool. **Policy 4G** states: *It is the policy of the State of Oregon to manage effectively existing transportation infrastructure and services before adding new facilities.* The **Oregon Highway Plan, Policy 1G**, has a similar objective stating: *It is the policy of the State of Oregon to maintain highway performance and improve safety by improving system efficiency and management before adding capacity. ODOT will work in partnership with regional and local governments to address highway performance and safety needs.* The related **Policy 1G, Action** further stipulates how the **Major Improvements Policy** is to be carried out. **Action 4G.3** states: *“Use demand management and other transportation systems operation techniques that reduce peak period single occupant automobile travel, that spread traffic volumes away from the peak period, and that improve traffic flow. Such techniques include HOV (high occupancy vehicle) lanes with express transit service, carpools, parking management programs, peak period pricing, ramp metering, motorist information systems, route diversion strategies, incident management, and enhancement of alternative modes of transportation including bicycling and walking.”*

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<sup>33</sup> Aaron S. Edline, *Per-Mile Premiums for Auto Insurance*, Institute of Business and Economic Research Economics Department Working Papers, University of California, Berkeley, 2002, Paper E02'318.

## **Education and Community Involvement**

In order for sustainability to be effectively achieved, citizens need to be part of the sustainability movement because sustainability reflects a community value. Sustainability involves both changes in citizen behavior and community design. The Transportation Research Board notes that sustainability considerations are affecting people's travel patterns and that education about environmental impacts of motor vehicles influences this trend. Researchers note that both policy changes and community action are needed to address the problem of global warming. The Governor's Advisory Group on Global Warming will include an educational component. The Oregon Environmental Council, the Coalition for a Livable Future, Oregon Solutions and other Oregon non-profit organizations work to educate Oregonians about livability, sustainable development and sustainable transportation issues.

The ME3, Sustainable Minnesota plan has developed a public awareness campaign that ties the effects of global warming and rising temperatures to changes to Minnesota's landscapes and businesses.<sup>34</sup> The TravelSmart™ program is another approach developed in Australia that provides one-on-one education about travel alternatives. The results of a recent TravelSmart™ pilot study in a Southwest Portland neighborhood showed that targeted participants made an 8 percent reduction in their auto trips.

## **Transportation Demand Management**

Transportation demand management (TDM) involves educating individuals and communities about changing travel behavior, including shifts in travel time, route, mode and destination. Trip choices include using roads, transit systems, bicycle and pedestrian facilities, and rail. TDM program staff work with local employers to develop on-site or area-specific commute trip reduction programs and incentives.

Research shows that over the past three decades changes in the way Americans work and live have made it more difficult for people to change their commuting habits. Commute distances have lengthened; the need to transport children as part of daily commutes has risen along with the increase in single parent and two income households. Work schedules and work location have become more flexible in part due to cellular and computer technology, allowing a highly mobile workforce. A significant segment of the population views their time commuting by car as a welcome time of solitude. Businesses located in suburbs typically include free parking, which removes the greatest disincentive to driving alone. Increasing TDM faces a number of challenges too:

- Family-wage jobs are increasingly difficult to secure, especially in rural Oregon. Many workers are seeking employment in towns or cities located 50-100 miles from home one way, which increases commute costs;
- For rural Oregonians that do not have access to a car, their options for employment are limited to the extent of the local transit service or ability to find a ride with a co-worker.

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<sup>34</sup> [www.ME3.org](http://www.ME3.org)

Most rural transit service is targeted towards the needs of the elderly and disabled, and often does not meet the needs of commuters satisfactorily;

- As the population ages and loses the ability to drive, the need for alternatives to the automobile will increase. This means creating good transit and other mobility options and more pedestrian-friendly urban design standards.

The traditional employer-based TDM program elements are being refined or replaced by new programs that address a broader spectrum of the community's travel needs. Socio-economic factors associated with an aging population, increased travel distance to employment, and the potential for targeted outreach to change travel choice could be included in an expanded program. For example, Portland's TravelSmart™ project shows that people will make modal changes in significant numbers if given information specific to their location and travel needs. TravelSmart™ shows great promise for creating quantifiable mode change, regardless of the type of trip.

#### ODOT Transportation Demand Management Program

Current TDM strategies in Oregon are focused on reducing peak hour traffic congestion by eliminating commute trips. TDM techniques are applied primarily in Oregon's six largest urban areas (Portland, Eugene, Salem, Medford, Albany/Corvallis and Bend) where ODOT funds programs that encourage the use of a variety of travel options. Funding processes for the state's TDM programs vary. IN ODOT Regions 2, 3 and 4, TDM dollars compete with operating funds, resulting in program funding fluctuations. The 2003 Legislature approved an additional \$1.5 million biennially for further implementing TDM measures.

#### OTP Transportation Demand Management Policy

Oregon Transportation Plan **Policy 1A, Balance**, recognizes the benefits of creating a balanced set of travel options and of reducing peak hour traffic volumes. **Policy 4G**, specifically addresses demand management: *It is the policy of the State of Oregon to manage effectively existing transportation infrastructure and services before adding new facilities.*

#### **Action 4G.3**

*Use demand management and other transportation systems operation techniques that reduce peak period single occupant automobile travel, that spread traffic volumes away from the peak period, and that improve traffic flow. Such techniques include HOV (high occupancy vehicle) lanes with express transit service, carpools, parking management programs, peak period pricing, ramp metering, motorist information systems, route diversion strategies, incident management, and enhancement of alternative modes of transportation including bicycling and walking.*

## Deployment and Promotion of Alternative Modes

Many Oregonians do not live in communities with well-functioning public transportation systems. The deployment and promotion of alternative modes including public transit may be a new effort or an ongoing effort.

Public transit services are provided by hundreds of different service providers throughout Oregon. The update of the Oregon Transportation Plan will include an examination of how the delivery of public transit services in Oregon can increase emphasis on service over fleet management. This research may lead to greater efficiencies and coordination between providers.

The Brookings Institute suggests: "...possibly the only way to improve air quality and reduce energy consumption without imposing new taxes, government mandates or regulations is to increase the use of public transportation." The American Public Transit Association (APTA) estimates that if one in ten Americans used public transit regularly, U.S. reliance upon foreign oil could be cut 40 percent.<sup>35</sup>

## **BARRIERS TO SUCCESSFUL IMPLEMENTATION OF SUSTAINABLE PRACTICES**

The Transportation Research Board identifies primary barriers to successful implementation of sustainable practices as lack of U.S. national policy and financial support to make changes in the transportation system that would support sustainability. These changes could include alternative fuel development and investment, linking land use and transportation, significantly increasing fuel efficiency, and ensuring that users pay externality costs. Currently, alternative modes are not always as convenient or inexpensive in terms of time and dollars as the automobile.<sup>36</sup> Institutional issues also exist. In most states, transportation and land use responsibilities are under different agencies with different focuses. Oregon is somewhat of an exception with programs that are integrated through the state land use program. Additionally, researchers note "that most Americans have had little experience with healthy communities that are not highly automobile dependent."<sup>37</sup>

Underpricing the transportation system is identified as a major barrier to promoting and developing alternative modes. "Low transport costs increase economic efficiency and productivity, leading to economic development, but transport *underpricing* has the opposite effect, since it increases total transportation costs. Most claimed benefits of underpricing are really economic transfers, in which one group benefits at another's expense. Educating policy makers, planners, and the public about problems created by underpricing is a key challenge to developing an efficient and equitable transportation system."<sup>38</sup> A State of Washington report

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<sup>35</sup> For further discussion about fuel availability, see Oregon Department of Energy, *The Future of Alternative Fuels*, OTP background paper, January 2004.

<sup>36</sup> *Transportation and The Economy*, 2003, OTP background paper

<sup>37</sup> Litman, Victoria Transport Policy Institute, 2001

<sup>38</sup> Victoria Transport Policy Institute, *Transportation Cost Benefit Analysis*, p.11-1

estimates that a comprehensive package of state level tax and price shifts could reduce total driving by 35 percent.<sup>39</sup>

Some suggest that sustainable planning is another name for comprehensive and coordinated planning and note this may be true, but most jurisdictions have done a poor job of comprehensive planning.<sup>40</sup> This is less true in Oregon than in other states due to growth management policies. The Transportation Research Board notes that despite the barriers, there is clearly growing local, state, and national interest in sustainable transportation.

## **SUCCESSFUL IMPLEMENTATION OF SUSTAINABLE PRACTICES AND POLICY**

Both short term and long term strategies are needed. Based on the research conducted in the U.S. and Europe, the TRB researchers suggest that the U.S. would benefit by leading by example. Conducting long term and middle term strategic planning is also recommended to identify strategies and steps to achieve desired results, “coupling fiscal incentives with desired actions that are supportive of specific goals.” Other researchers suggest that a convenient and simple economic indicator of transportation sustainability is transportation expenditures – on what and how the money is being spent. As a step toward coupling “fiscal incentives with desired actions” and tracking the money being spent, the Oregon Transportation Commission has identified *project funding eligibility and prioritizing criteria*. Included are criteria that support pricing the transportation system (e.g. tolling). If implemented and structured properly, shifts in travel behavior could result.<sup>41</sup>

## **CONCLUSION AND RECOMMENDATIONS**

Transportation is a focus of sustainability because transportation is so prominent in the many issues that sustainable development aims to address, such as greenhouse gas emissions, urban sprawl and habitat destruction. Transportation is one of the largest contributors of greenhouse gas emissions in Oregon and a major contributor to global warming.

Planning for sustainability requires changing the way people think about and solve transportation problems. Integrated solutions are necessary. Optimal solutions include a balance between economic, social and ecological objectives. Researchers have identified a range of steps that can be taken to move toward sustainable transportation systems.

Improving vehicle mileage and reducing the miles traveled are two of the most beneficial actions, but these are also issues that go against deeply held cultural values in the U.S. Improved travel choices supported by pricing incentives, urban design, technological

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<sup>39</sup> Energy Outreach Center, *Road Relief; Tax and Pricing Shifts for a Fairer, Cleaner, and Less Congested Transportation System in the State of Washington* (Olympia; [www.eco.org](http://www.eco.org)), 1998.

<sup>40</sup> Litman, Burwell, *Issues in Sustainable Transportation*, p.1.

<sup>41</sup> Oregon Transportation Commission adopted, *Project Eligibility Criteria and Prioritizing Factors for 2004 – 2007 Construction State Transportation Improvement Program* (STIP). <http://www.odot.state.or.us/stip/>

innovation and land use changes that reduce the need to travel provide a framework for sustainable transportation policy and actions.

Actions to address sustainability will involve supporting a cultural shift. ODOT has identified the development of a state transportation sustainability policy as one of three actions that the agency should take to implement the Governor's Executive Order on sustainability. Oregon Transportation Plan **Goal 1B, Efficiency** provides a good framework from which to build a sustainable transportation policy for Oregon.

### Oregon Transportation Plan Policy Update Recommendations

The recommendations below are staff-generated based on local and international research. The recommendations are intended to help initiate discussion of the Sustainability and Transportation Choices Policy Committee, organized as part of the Oregon Transportation Plan update and made up of community members from around Oregon. The recommendations of the Sustainability and Transportation Choices Policy Committee will be made to the Oregon Transportation Plan Update Steering Committee and ultimately form the basis of policy adopted by the Oregon Transportation Commission.

**1. Update policy to promote decision-making and actions that integrate economic, community, and environmental values:**

- Refinement may include reaffirming and further defining **Policy 1B, Efficiency**.
- Use ORS 184.423 addressing sustainability as guidance to update OTP policy language.
- Recognize that moving toward sustainability is a process that will occur over time; reflect a desire to use state of the art products, practices, and policies.
- Note that valuing externalities and considering life-cycle costs are fundamental aspects of decision-making that supports sustainability.

**2. Explore the possibility of using financial incentives to promote desired sustainable transportation actions.** This might include price structures that reward using alternative modes and reducing vehicle miles traveled, legislating greater incentives for alternative fuel vehicles or fuel efficient vehicles, mileage-based insurance, and peak period pricing.

**3. Support new technology and transportation investments that promote sustainable transportation and sustainable development.** Potential investments range from technology that helps price travel to greater efficiency in public transit movement through technological advances.

**4. Explore how education-based innovations in transportation demand management can be more broadly applied throughout Oregon.** Recent pilot studies have shown as much as an 8 percent shift in travel behavior. Consider public outreach, better research and documentation, innovation and better integration into the planning process.

5. **Encourage the availability of Location Efficient Mortgages (LEM) programs** that consider the reduced household expenses of locating in a community well served by transit and local services when determining mortgage levels.
6. **Develop policy that encourages local transportation plans to recognize the links between travel behavior and maintaining good health.** This may include additional partnering with health professions to create greater public awareness.
7. **Work to see that policy implementation occurs at the local, regional, and state level.** Outline policy implementation measures concurrent with the OTP plan update.

## Appendix A

### Executive Order 03-03, A Sustainable Oregon for the 21<sup>st</sup> Century

Pursuant to my authority as Governor of the State of Oregon, I find that:

While Oregon's economy is in distress, it has many assets: natural resources, a clean environment, extensive telecommunications and traditional infrastructure, and an educated and skilled workforce.

Oregon's economic recovery will be aided by establishing a commitment to lasting solutions that simultaneously address economic, environmental and community well being. We should not continue to trade one essential aspect of well being off against another, but we should take actions that will sustain Oregon's assets and put Oregon on the path to long-term prosperity in all aspects of life.

Sustainability is doing business with an eye to the triple bottom line – economy, community and environment. Oregon State government must define sustainability, produce goals within state government to achieve sustainability, identify challenges to achieving sustainability and measure our performance based on sustainability.

This executive order is intended to support and drive the goals of the Oregon Sustainability Act (Act) adopted by the Legislature in 2001. Using the powers vested in the Oregon Sustainability Board under the Act, this Order directs the Board and state employees to move us closer to a more "sustainable" state.

NOW, THEREFORE, IT IS HEREBY ORDERED AND DIRECTED:

#### Board Actions

In accordance with the Oregon Sustainability Act (Act), ORS 184.423, Sections 2(5) and 3, the Oregon Sustainability Board (Board) is directed to manage and carry out this Order. To do so, it shall:

1. Constitute and convene a Sustainability Leadership Team ("Team") to provide recommendations to the Board and to manage and deliver Board directives to state agencies as approved by the Board. The Team shall be chaired by the Director appointed by the Board pursuant to Section 7 of the Act, or, in her or his absence, the Director of the Department of Administrative Services (DAS), and shall consist of the following members: the Director of DAS, the Chair of the Board, the Director of the Office of Energy, the Governor's Sustainability Advisor, the Director of the Economic and Community Development Department, the Director of the Oregon Progress Board, the Governor's Natural Resources Advisor, the Director of the Department of Housing and Community Services, and such other members as may be requested by the Board from time to time. The Team shall review, revise and recommend for Board approval the Plans prepared by each Agency Sustainability

Coordinator as directed under this Order. Pursuant to its authority under the Act, the Board may request additional agencies to provide similar Plans from time to time, or request other actions consistent with its authority under the Act.

2. Within 90 days of this Order, the Team shall deliver to the Board for its review and approval written guidance (“Sustainability Guidance”) to state agencies regarding each agency’s actions to comply with this Order. To the extent possible, the Team will seek expertise outside state government to assist in the development of the Sustainability Guidance. The Sustainability Guidance shall include the following:

- 2.1 a working definition of sustainability for state agencies to guide their actions;
- 2.2 suggested strategies for achieving greater sustainability;
- 2.3 a policy directive for economic, social and environmental sustainability that accounts for resource constraints and similar financial variables;
- 2.4 performance standards, targets and evaluation methods to determine agency compliance;
- 2.5 identification of key leverage points within and outside state government to enhance sustainability;
- 2.6 identification of cross-agency programs that intersect with sustainability goals;
- 2.7 state agency reporting protocols;
- 2.8 a means to assess the financial impact of proposed actions on state expenditures;
- 2.9 a directive to develop partnerships with other government and private entities;
- 2.10 identification of outreach programs to promote practices endorsed in this Order;
- 2.9 identification of training and staff development methods;
- 2.10 identification of potential incentives and acknowledgement for agencies that exceed performance expectations;
- 2.11 a directive that each state agency develop Implementation Plans (“Plans”) to comply with these Sustaining Guidelines and any other directive on sustainability from the Board; and
- 2.12 any other guidance to enable state agencies to carry out this Order and sustainability directives from the Board.

3. Pursuant to Section 3 of the Act, the Board shall develop cooperative programs that involve local government, non-profit entities and private industry to achieve the objectives of the Act and this Order.

4. Under the direction of the Board, DAS shall update and maintain the current Oregon Solutions webpage.

5. Under the direction of the Board, the Economic and Community Development Department shall provide staff assistance for meeting scheduling, notification and drafting of documents for an Interagency Sustainability Network (“Network”). The Network shall be an informal forum of state agency personnel, including the Team and each Sustainability Coordinator, whose purpose is exchanging information and developing new approaches on sustainability among state agencies. State agencies should participate in the Network to the extent needed to support this Order. The Network forum will convene periodically to suggest

recommendations to the Board on ways to enhance sustainability in Oregon through modification to the Sustainability Guidance, legislation, and other means.

6. The Board shall recommend for the Governor's approval by December 1, 2003, and after approval for dispersal to all agencies through the Oregon Advisory Committee on Government Performance and Accountability, changes in performance management to better incorporate sustainability into the state's management practices. These recommendations shall include but are not limited to: performance standards for agencies, performance measurement and internal audit standards.

7. The Board shall provide guidance to state agencies on how to apply and support the Governor's Oregon Solutions and Community Solutions systems for community-based action to achieve the ten community objectives listed in ORS 184.423 (2).

#### State Agency Actions

1. Within 90 days of the date of this Order, the director of the agencies identified in paragraph 3 below, shall designate a senior manager within each such agency as the agency's sustainability coordinator ("Sustainability Coordinator"). The Sustainability Coordinator is responsible for the agency's compliance with this Order.

2. Within 90 days of the Board's issuance of the Sustainability Guidance, each Sustainability Coordinator shall prepare a plan to implement such guidance and submit the plan to the Board ("Plan"). The agency's Plan shall include appropriate performance measures, and a strategy for meeting the Sustainability Guidance that is incorporated into the agency's 2- and 6-year strategic plans as well as the agency's biennial budget submission to DAS, as appropriate.

3. In accordance with ORS 184.423 Section 2 (5), the following agencies shall each develop and implement a Plan as described above in paragraph 1.: Administrative Services, Economic and Community Development, Environmental Quality, Land Conservation and Development, Housing, Forestry, Energy, Transportation, Progress Board, Agriculture, Watershed Enhancement, Parks and Recreation, Fish and Wildlife, State Lands, Water Resources, the Public Utilities Commission, Human Services, Corrections, Higher Education, and Community and Business Services.

Done at Salem, Oregon this 17<sup>th</sup> day of June, 2003

Oregon Department of Transportation Actions  
under Executive Order 03-03

- *Develop specific sustainable measures and criteria for the demolition, design and construction of bridges in the state.*

This recommendation is being implemented as one of the main stretch goals in ODOT's Sustainability Plan: incorporating sustainability into the Bridge replacement project.

- *Oversee development of an Environmental Management System (EMS) in the Maintenance Division by a certain date to minimize the environmental impacts of the maintenance of the transportation system through Oregon while providing an effective transportation system that supports both the economic activities of the state and the livability of communities. The Environmental Management System could be documented so that cost and timesavings can be identified along with environmental protection improvements. The documentation would be designed as a model for other ODOT Divisions, other state agencies, and other large government entities.*

This recommendation is being implemented as another of the main stretch goals in the ODOT Sustainability Plan: an EMS for the maintenance yards. The EMS will focus on only a part of the Maintenance Division facilities and activities, but will probably be expanded as the first part is completed.

- *With DEQ: Determine options for reducing diesel truck and other diesel equipment idling, especially in populated areas, including their authority to implement such actions.*

This recommendation is being considered as part of the Climate Change Work of the Western Governors' Climate Change Initiative. The existing "Green Light" Program will be expanded to further reduce diesel emissions at weigh stations.

## **Appendix B**

### **ODOT Sustainability Practices in Place**

#### **Community**

- Transportation and Growth Management Program – grant program to implement transportation and land use strategies.
- Highway Segment Designations - Implementation of the Oregon Highway Plan transportation and land use policy that includes special transportation areas.
- Cultural Resources and Archaeology - Promote pedestrian safety and preservation of downtowns by implementing ideas found in the “Historic Downtown Main Streets, Strategies for Compatible Streetscape Designs.”
- Coordinated Public Transit Services - Work cooperatively with Department of Human Services in the development of coordinated “call centers” from which client transportation services will be consolidated and centrally managed by public transit agencies.
- TripCheck – Website with travel information.

#### **Environment**

- Collaborative Environmental and Transportation Agreement for Streamlining (CETAS)
  - Partnership with the other natural resource agencies to identify ways to coordinate environmental protection and stewardship with major transportation projects.
- Climate Change
  - Participate on the Government Operations Subcommittee of the Advisory Group on Global Warming as a part of the Western Governors’ Global Warming Initiative.
- Reduction of Fuel Emissions through the purchase of new vehicles based on revised Department of Administrative Services guidelines to reduce emissions of greenhouse gases.
- Conversion of Fleet to Lower Emission Diesel Engines - When purchasing new trucks, specify that they meet new Environmental Protection Agency requirements for diesel engine emissions.
- Endangered Species Act compliance
- Fish Passage Program - Creation of fish passage at obstructed culverts on a priority basis in concert with the Oregon Department of Fish and Wildlife.

- Native Plant Communities - Use of native plants in new landscape plantings.
- Truck Weigh-in-Motion Program (Green Light) - Technology used to weigh commercial heavy vehicles in motion rather than requiring them to stop at static scales. The results are fewer diesel emissions from idling at weigh stations and monetary savings for the trucking operation in terms of time and fuel.

### **Efficiency**

- Contract Specification - Including sustainability measures in contract specification where appropriate.
- Office Purchasing Practices- Using new Department of Administrative Services guidelines for sustainable office purchasing practices.
- Energy Conservation – Participating on the Governor’s Operations Subcommittee of the Advisory Group on Global Warming as a part of the Western Governor’s Global Warming Initiative.
- Technology to improve traffic flow message boards, signal synchronization, ramp metering.
- Reducing power utilization (efficient lights (HPS/LED) creating savings of over two million-kilowatt hours of electricity each year).
- Transportation Demand Management program.

### **Economy**

- Trucking Online Services - Continue to work on this activity as part of ODOT’s response to the Executive Order on Regulatory Streamlining.
- Driver and Motor Vehicle e-Business - Continue to work on this activity as part of ODOT’s response to the Executive Order on Regulatory Streamlining.

### **Maintenance Practices**

- Innovative vegetation management to reduce pesticide use.
- Reduced width of residual herbicides.
- Reuse of chemicals.
- Investigating environmentally friendly operating fluids.
- Vegetable oil used in place of petroleum-based hydraulic fluids.
- Reduction of hazardous material spills through safety inspections and education.
- Development of specifications to allow recycled materials including plastics, compost, slag, recycled asphalt, and tree stumps to be used for fish habitat.

## Appendix C

### European Strategies for Sustainability<sup>42</sup>

**TABLE 3 European Strategies for Sustainability: Germany (Berlin)**

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**Overall Strategies for Sustainability:**

- Work within European Union framework, apply local regulations (no overall package of measures for country)
- Qualitative vision and quantitative criteria – noise, air quality, acidification, CO<sub>2</sub> reduction, etc.
- Multimodal planning and least cost planning
- Avoid trips, shift to less damaging modes, optimize road capacity, improve vehicle technology, deploy telecommunications and ITS
- Land use strategies – German City Association: density and mixed use, corridor and wedge, reinforce existing centers, discourage or ban Greenfield stand-alone malls; focus development at crossing of transit lines
- Education and research
- User fees to reflect full costs (not yet supported by public except perhaps for trucks)

**Examples of Sustainable Development and Sustainable Transport:**

- Truck impact management – vehicle taxes, fuel taxes, time restrictions
- Rail and sea emphasis for freight
- Logistics and ITS to manage freight movements
- Speed advisories to avoid congestion
- No new roads, but upgrade and some widening
- In longer term, highway management using ITS
- Traffic calming
- Federal regulations on urban development – compact growth, pedestrian, bike, and transit access
- Coordinated land development and transport improvements
- Emissions standards for vehicles
- Intermodal improvements including use of tunnels
- Transit emphasis
- Dedicated bus lanes
- Transit connections to airport
- Bicycle facilities well connected to rail
- Construction logistics to reduce adverse impacts
- Recycled materials in construction and reconstruction

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<sup>42</sup> Excerpts from *U.S. Dilemmas and European Experiences, Sustainability and Environmental Concerns in Transportation* 2002, Transportation Research Board

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**TABLE 4 European Strategies for Sustainability: The Netherlands (the Hague, Rotterdam)**

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**Overall Strategies for Sustainability:**

- Get prices right
- Access as focus – land use as well as transport
- Support existing centers
- Provide multimodal transport in line with sustainable policies
- Quality services door to door
- Quality design – including undergrounding
- Public-private land use-transport solutions

**Examples of Sustainable Development and Sustainable Transport:**

- Manage demand by using pricing to appropriately reflect full costs
- ABC policy – Focus development where there is greatest access
- Development contiguous to existing cities and towns, mixed use
- Infrastructure policies aligned to support sustainable development (including water, sewer, etc.)
- Limit stand-alone shopping malls, etc.
- Traffic calming
- Preserve *Green Heart* of the region
- Plan for whole trip chain not mode by mode (e.g., bike storage at apartment, bike lane to train station, storage or on-board option, etc.)
- Truck logistics
- Plan for technological change in vehicles, ITS, etc. – focused on safety and congestion relief (getting 10% less congestion)
- Prohibit cell phone use while driving unless hands free
- Driverless people mover connecting office park and rail station
- Public-private partnerships to help pay for high cost items
- Undergrounding roads, rail, parking

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**TABLE 5 European Strategies for Sustainability: Scotland (Edinburgh)**

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**Overall Strategies for Sustainability:**

- Regional strategies for development and transport; integrate transport and land use
- Central city vitality
- Public transport competitive and attractive
- Compact and contiguous suburban development
- Emphasis on exchange, not movement

**Examples of Sustainable Development and Sustainable Transport:**

- Travel Wise program – try to educate public; think before you travel, chain trips, walk or bike, etc.
- Extensive green lane system for bus priority

- Parking pricing
- Car club experiment
- Traffic calming
- Bike streets, bike ways
- Wider sidewalks (also good for business)
- Lower speeds in some zones
- Speed enforcement by camera
- Recycled materials in construction

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**TABLE 6 European Strategies for Sustainability: Sweden (Stockholm)**

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**Overall Strategies for Sustainability:**

- Strategy is “lots of small things” but done in collaboration and put together into an overall strategy
- Access, quality service, safety, good environment, economic development – all objectives for transportation plans
- Transportation providers must meet social and environmental objectives, are evaluated on social and environmental performance
- Collaborative efforts to identify and remove conflicts, pursue areas of agreement
- Strategic planning, performance measures, monitoring, evaluation & feedback to strategic plan
- Environmental goals integrated with planning processes
- Accelerate attainment rather than change direction
- Lead by example – show good practices in government first
- Try things out and see what works – e.g., fossil fuel-free community
- Recognize that general public is not so concerned or knowledgeable about global issues, but are concerned about local ones such as too much traffic – build upon local understandings, expand understanding and educate.

**Examples of Sustainable Development and Sustainable Transport:**

- Emphasis on making transit work – performance goals
- Subsidy reduced but more efficient service
- Customer orientation – market surveys, information systems at stops, remove barriers, etc.
- Quality architecture and landscape design in stations, stops
- New towns at walkable densities, near transit, etc.
- Redevelop centers – recognize cultural and social importance
- Build and rebuild to reduce negative impacts, e.g., underground roads, traffic calming
- Biodiversity protected through good planning, design, and maintenance
- Remove barriers for animals
- Careful choice and use of road materials; recycled materials used
- Alternative fuels; hybrids for buses and government fleets; Zeus project
- Truck improvements being sought – incentives for cleanup
- Rail improvements for freight
- Zero deaths safety plan – grade separation, traffic calming, in-vehicle protection, education