



METRO

REGIONAL INFRASTRUCTURE ANALYSIS

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EXECUTIVE SUMMARY

As a number of recent incidents have graphically illustrated, the United States faces an infrastructure crisis of epic proportions. Congressman Earl Blumenauer has observed that the nation has no plan for building the roads, bridges, water and sewer lines, energy facilities, and other physical projects that support our communities.

“We’re losing this battle,” says Blumenauer. “We’re investing less in infrastructure than in any time in our history.”

The Portland region is not immune to this serious problem. Past plans that guided investments are outdated. The lack of adequate financing mechanisms has led to maintenance being postponed and neglected. Despite widespread recognition that sound infrastructure is critical to maintaining and enhancing regional economic growth, competitiveness, productivity and quality of life, current approaches to the planning, development and financing of critical community support systems are not working.



To make matters worse, approximately one million more people are expected to live in the seven-county Portland metropolitan area within thirty years. The estimated cost of building

the public and private facilities needed to accommodate growth in jobs and housing in the three-county Portland region through 2035 is \$27-41 billion. Traditional funding sources are expected to cover only about half that amount. Even if the region does not experience this projected growth, \$10 billion is needed just to repair and rebuild our existing infrastructure.



Systems development charges, gas taxes and other revenue sources are not keeping pace with rising infrastructure costs, while voter-approved tax limitations and other ballot initiatives have crippled the ability of communities to fund these services. Rate-funded services tend to enjoy more stable and predictable funding, but can face significant difficulties in obtaining large amounts of up-front capital needed to make major improvements or expand capacity.

All of this leads to one unavoidable conclusion: we cannot continue to do things as we have in the past. New and creative solutions are essential.

Expenditures to improve public infrastructure are investments. As with other types of investments, the public should expect a return on its investments in public infrastructure.

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That return can take many different forms, including quantitative measures such as higher tax revenues, improved housing or more jobs. Other “returns” could include more qualitative benefits, such as strong and livable communities. Although investing in infrastructure is expensive, the return on that investment directly improves the lives of the people who live and work here. Public investment is also necessary to make private investment possible and profitable, and private investment is what ultimately builds great communities.

In 1995, the Portland region adopted the 2040 Growth Concept, a long-range plan to guide future growth and development. This innovative blueprint for the future is based on a set of shared values that continue to resonate with residents of the region: thriving neighborhoods and communities, abundant economic opportunity, clean air and water, choices in housing and transportation, access to nature, and a sense of place that, taken together, are the reason people love to live here.



However, this vision will not become a reality unless we can provide the infrastructure to support it. Local and regional leaders have identified the lack of adequate infrastructure funding as a key barrier to successfully realizing the aspirations embodied in the 2040 Growth Concept.

To address this issue, Metro initiated a process to identify infrastructure needs, assess the funding gap, and explore financing and other policy options. The analysis focuses on eight infrastructure types needed to make and sustain great communities:

- Civic buildings, parking structures, public plazas
- Energy
- Schools
- Roads, transit, bike lanes and sidewalks (transportation)
- Stormwater
- Urban parks and open spaces
- Wastewater (sewers)
- Water

It is important that the region continue its legacy of coordination among local jurisdictions and the general public to identify and address the highest priorities for providing infrastructure to serve both existing and future residents. Political leadership and public engagement efforts will be needed to raise awareness of infrastructure needs and issues and garner support for agreed-upon solutions. Metro, along with its local government partners, plays a key role in leading this regional dialogue and building consensus.

Infrastructure planning, development and finance strategies are organized into the following four approaches:

Efficient Service Delivery

Fragmented delivery systems often result in reduced efficiencies. Better coordination among service providers can lead to cost

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savings through sharing facilities and service delivery, adjusting service areas, merging service districts, and reallocating funding responsibilities for community and regional facilities. Improved maintenance of existing infrastructure systems ensures a maximum return on past investments. Potential strategies include:

- Shared public facilities
- Regional coordination and planning
- Systems maintenance

Demand Management

Reducing the demand for services can help prevent or delay the need for major capacity investments. Components of demand management include focusing growth to use existing capacity first, using pricing and other incentive-based strategies to reduce demand and shift it to off-peak times, and educating the public on conservation strategies. Potential strategies include:

- Compact development patterns
- Peak-use pricing
- Public education and resource conservation

Innovative Planning and Design

Emerging technologies provide opportunities to increase efficiencies and conserve resources over the long term. Investments in research and development of innovative approaches to infrastructure planning, design and construction can make infrastructure systems more sustainable and build community support. Preparing for the impacts of new technologies will result in long-term cost savings. Potential strategies include:

- Infrastructure recycling and reuse

- Sustainable infrastructure (e.g., natural systems, co-generation facilities)
- Emerging technologies (e.g., electric cars and water reuse systems)



New Funding

New funding sources are needed to enable the region to upgrade and replace deteriorating infrastructure systems and provide services to newly urbanizing areas. The region also needs to identify and remove barriers to public and private investments in infrastructure. Communities in the region can work together to secure funds at the local, community and regional levels and to leverage federal and state investments. A regional approach to financing basic infrastructure could help achieve the region's long-term vision. Potential strategies include:

- Pursuit of new state and regional revenue sources
- Public-private partnerships
- Strategic land acquisition

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CONSIDERATIONS FOR MOVING FORWARD

Changing times require new approaches to infrastructure provision and finance. This analysis describes the region's infrastructure challenges and begins to quantify the problem and lay out some options to address the region's infrastructure needs. However, tough questions remain as the region moves forward:

- There will never be enough money for everything – how can we most efficiently guide public investment decisions to strategically target limited resources?
- Can managing demand reduce the need to expand the capacity of infrastructure?
- Are we providing infrastructure services at the most efficient level (geographical or jurisdictional), or are there opportunities to achieve economies of scale or efficiencies?
- How can we best address competing fiscal demands for new infrastructure, maintenance needs, and upgrades of existing facilities?
- Do service providers currently have the capacity to research and share information with counterparts nationally and globally to facilitate the adoption of innovations in service delivery?
- Will incorporating global climate change and sustainability into public messages help manage consumption?
- How can government deepen public understanding of the infrastructure challenges and increase public support for infrastructure finance?



RECOMMENDATIONS FOR ACTION

The time is right for decisive action by elected and appointed leaders across the region to address our infrastructure needs.

Recommended actions:

- Coordinate regional partners to identify state legislative changes that would increase our capability to finance regional infrastructure needs.
- Convene regional partners to explore opportunities to implement solutions that increase efficiency and better manage demand.
- Increase public awareness of infrastructure needs and the importance of setting priorities with limited resources.
- Recognize return on investment when making public investment decisions in both urban and newly urbanizing areas.
- Encourage and facilitate implementation of new technologies that increase the efficiency and sustainability of infrastructure systems.

INTRODUCTION

The Portland region is facing a significant challenge to maintain, preserve and provide adequate infrastructure to meet the needs of current and future populations. Public investments made today will shape the region for years to come. The region is projected to grow more rapidly than expected since the region endorsed the 2040 Growth Concept in 1995. More people and the accompanying need for land, jobs and housing are best served when urban lands are used and redeveloped efficiently. Rising costs for building and maintaining public facilities in existing communities further highlight this need. Geographic areas recently added to the region's urban growth boundary are still largely undeveloped and may remain so for some time due to a lack of necessary infrastructure.

Local and regional leaders have identified the need for additional funding for infrastructure as a key to successful implementation of the 2040 Growth Concept vision and accommodating expected population growth. Metro's Making the Greatest Place Initiative is an effort to identify what the region has been doing well to achieve the 2040 vision, capitalize on successes and increase efforts where needed. Metro Council and other leaders throughout the region are seeking better information to aid them in important policy decisions. To that end, Metro initiated this process to identify infrastructure needs, assess the funding/financing gap, and explore financing and other policy options in partnership with leaders throughout the region. The analysis focuses on eight types of infrastructure that make and sustain great communities:

- Civic buildings, parking structures, public plazas
- Energy
- Schools
- Roads, transit, bike lanes and sidewalks (transportation)
- Stormwater
- Urban parks and open spaces
- Wastewater (sewer)
- Water

The study explores the following:

- What infrastructure is needed to serve existing residents and accommodate future growth? What issues need to be addressed?
- What will it cost to provide needed infrastructure? Where do we experience the greatest cost efficiencies?
- What infrastructure is planned? What is the funding/financing gap?

The vision of the 2040 Growth Concept is to establish complete communities that include:

- safe and stable neighborhoods for families
- compact development that uses both land and money more efficiently
- a healthy economy that generates jobs and business opportunities
- protection of farms, forests, rivers, streams and natural areas
- a balanced transportation system to move people and goods
- housing for people of all incomes in every community



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- What are potential planning, development and financing policy options? How can we target infrastructure investments to get the greatest return?



NEEDS AND ISSUES

NATIONAL TRENDS

National population growth and increasing maintenance needs have resulted in a demand for additional infrastructure funds. The United States population is expected to grow 33 percent by 2035. Approximately 94 million more people will live here than in 2000. In addition to the need for new infrastructure to accommodate this growth, existing infrastructure systems are aging and overburdened and require substantial maintenance and upgrades. Moreover, current designs cannot support projected population and economic growth. Deteriorating infrastructure threatens the economy, environment and quality of life. The American Society of Civil Engineers (ASCE) rates the nation's water, sewer and transportation systems a grade of D-minus. More than 72,000 miles of municipal water and sewer pipelines are more than 80 years old.

According to the ASCE, an estimated \$1.6 trillion is needed over the next five years to

repair the existing infrastructure in the U.S. Any delayed investment increases this cost by 12-20 percent annually. It will cost \$250 billion annually over the next 50 years to ensure "good" infrastructure. The United States currently spends 40 percent of that each year.

The federal share of infrastructure funding has been declining since 1975 and many funds once available through state governments for capital improvements no longer exist. Financial tools such as the federal highway trust fund are being depleted.

Global climate change, increasing energy and fuel prices, an aging population and an increasing disparity in income and wealth will have significant effects on regional development. Drought in southern states due to climate change could accelerate population growth in the Portland region. In addition, climate change may reduce the water available from glaciers, increase winter storm events and decrease summer flows. This means greater demands on existing sources and the possibility of water being treated as a commodity and traded from wet to dry areas. Another likely result of climate change is a national greenhouse gas cap-and-trade system.

The Report of the City of Portland Peak Oil Task Force states that the availability of oil may have peaked and prices will continue to rise with demand. According to some, the expected outcome of increasing fuel prices will be more dense development patterns, increased use of alternative forms of transportation, an emphasis on efficiency and a diminished role for the automobile-dependent land use pattern. As baby boomers age, housing demand for older

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people will grow while lower and middle-class families may increase their preference for smaller, centrally located and easier to maintain units.

Another trend that may affect infrastructure is sustainable development. Portland and Oregon are considered national leaders in this field. Sustainability could serve as a framework for considering infrastructure investments and their impact on the region. Furthermore, increases in the prices of commodities, such as metals, heightens the need to promote the reuse and recycling of resources throughout the region.

Finally, there is an urgent need to ensure the provision of services and protection of critical physical infrastructure through emergency preparedness. Comprehensive emergency plans are needed to address infrastructure planning, engineering design, construction, and operation and maintenance activities for the purposes of homeland security and in response to natural disasters.



LOCAL TRENDS

People moving to the Portland region cite a strong and diverse economy, high quality of life, abundant public amenities and superior environmental quality as reasons for choosing the region. Metro forecasts show that within the next 30 years, one million more

people will live in the seven-county Portland metropolitan area.¹ About 70 percent of that growth is expected in the tri-county Portland region (region).² A population increase of approximately 680,000 people by 2035 is expected, bringing about 590,000 new jobs and 310,000 new households.

Policies in the 2040 Growth Concept encourage the efficient use of land by directing growth inward rather than outside the urban growth boundary (UGB). Growth is encouraged in centers and corridors with increased emphasis on infill and redevelopment and higher density development in areas where it is appropriate. The 2040 Growth Concept is designed to help communities find more efficient and less expensive ways to deliver services.

However, as communities in the region strive to create vibrant places to live, work and play, they have experienced slower than expected growth in designated centers and corridors and little to no development in areas recently added to the urban growth boundary. Infrastructure costs have been cited as major obstacles in both cases. The region faces significant challenges regarding how it can effectively maintain, preserve and expand public infrastructure.

Although the function and livability of our communities depend on reliable public services, infrastructure systems are fraught with investment and maintenance shortfalls, uneven funding systems and multi-layered

¹ The seven-county Portland metropolitan area includes Clackamas, Columbia, Multnomah, Washington and Yamhill counties in Oregon, as well as Clark and Skamania counties in Washington.

² The Portland region includes the existing and potentially urbanizing portions of the metro region within Clackamas, Multnomah and Washington counties.

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jurisdictional patterns. In addition to the need to address aging infrastructure conditions and upgrades needed to meet new environmental and emergency preparedness standards, the increasing population and employment base noted previously will put additional demands on roadway, transit, water, sewer, parks, schools and energy systems. This is accompanied by a common issue of concern for all service providers, how to raise and maintain sufficient funds.

Estimates of infrastructure capital costs needed to accommodate growth in the region over the next 30 years range from \$27 to 41 billion. Traditional funding sources are expected to cover only about half that amount. State initiatives such as Measures 5 and 50 have limited local revenue streams. Infrastructure provided through user fees or rate-payment systems benefit from more stable funding, but struggle to secure funding for large capital improvements. Non-rate-based infrastructure types are subject to the inconsistencies of voter-approved bonds. Systems development charges have not kept pace with rising infrastructure costs.

During the course of this analysis, Metro collected data from infrastructure service providers throughout the region. Sixty-four service providers completed questionnaires regarding local infrastructure planning and funding efforts. In addition, more than 125 service providers attended two workshops to discuss infrastructure needs and opportunities. A summary of needs and issues identified through this outreach process follows.

Civic Buildings and Facilities

Capital funds for civic structures such as police and fire stations are often subject to voter approval and must compete with other interests for scarce resources. Urban amenities such as plazas, streetscapes and some civic buildings – critical components of downtown redevelopment efforts – are often supported through urban renewal programs and public/private development agreements. There are no dedicated funding sources for operations and maintenance. Libraries are relatively well-supported with local bond levies for capital costs, but they also often lack adequate operations and maintenance funds. Land supply and price also are issues when jurisdictions consider sites for civic facilities.

Energy

Electric and gas utilities have a legal obligation to provide their chartered services, with rates established and monitored by the state Public Utilities Commission. Based on current trends, the region requires the equivalent of two to three new 400 megawatt power plants to supply adequate power by 2035. Siting of energy infrastructure in communities is an ongoing challenge for utility companies. Energy conservation efforts reduce revenues while also reducing demand for electricity, helping to defer the need to build expensive new facilities.



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Technological advances not yet known are likely to change the region's energy supply and infrastructure needs. Another challenge will be integration of district energy production and distribution systems into developing and redeveloped areas.

The most prominent challenge for energy providers is coordination with other service providers, transportation in particular. Better coordination in the planning and installation of infrastructure could result in cost savings for developers and rate payers. For instance, there are opportunities to place new energy and utility transmission systems within existing and planned transportation corridors. However, increasing demand for access to rights-of-way and denser development patterns make it difficult and more expensive to locate and relocate facilities. Local development code requirements often aggravate these problems.

Emerging energy sources also face difficulties in regards to location. Solar panels are often subject to development and design codes that restrict their application. There are a number of concerns about the siting of liquefied natural gas (LNG) transmission lines, including the potential for spills due to accidents or attacks and their effect on wildlife habitat and the environment.

Schools

While some areas of the region have underutilized school facilities, population growth will bring new school-aged residents to newly urbanizing areas, creating a geographical mismatch between existing school capacity and new school capacity needs. Future legislative mandates, such as full-day kindergarten, may

require additional classrooms. As land values increase, siting schools near population centers becomes increasingly expensive. Better coordination with local jurisdictions and developers in regards to new development could provide cost efficiencies. School districts benefit when new neighborhoods are built around schools and when planning for roads considers school access and bus routes. Funding for capital improvements, dependent on local voter approval, is inconsistent across the region and often restricted, as some jurisdictions do not allow new revenues to pay for operations and maintenance. The recently-approved construction excise tax will provide a new funding source, but only for land acquisition and planning.



Transportation

Transportation costs represent the largest portion of unmet infrastructure needs. Current state and local transportation resources for operations, maintenance and expansion of the system are limited. Oregon ranks last compared with other western states in total auto taxes collected. The Oregon Department of Transportation (ODOT), cities and counties devote nearly all existing state and federal gas tax revenues to operation and maintenance of the existing road system. Generally, about three quarters of local annual transportation

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and public utility capital improvement budgets are spent on maintenance, preservation and operation of existing transportation infrastructure. The result is little available funding to address new capital facility needs. Local roads are funded through development fees, local improvement districts (LIDs) and other mechanisms, which leverage additional private and public investments.

Payroll taxes have provided the primary source of revenue for transit operations and for routine expenditures such as fleet upgrades, vehicle purchases and replacements. Unlike the gas tax, payroll tax revenues expand as the region's economy grows and wages rise, allowing revenues to better keep pace with inflation. However, under its present statutory limitation, the payroll tax may be insufficient to support the system expansions needed to serve a rapidly growing ridership. Another challenge for transit providers like TriMet is developing partnerships with local governments and developers to provide complementary access to transit, such as sidewalks and transit-oriented development. Currently, sidewalks connect to only 69 percent of the transit stops in the region.

There is no dedicated source of revenue for development of new regional transportation systems such as bridges and highways, which are essential for the efficient movement of freight and, therefore, the region's economy. Additionally, insufficient funds for operations is a continuing challenge for all. Fuel costs continue to increase and gas tax revenues are expected to decrease as automobiles become more fuel-efficient. The state gas tax has not increased since 1993 and gas tax revenues have lost significant purchasing power due to

inflation and dramatic increases in material costs. It appears likely that electric vehicles will become more prominent in the next decade, requiring a new type of electrical energy charging station. Fuel cost increases already are stimulating transit ridership and could impact regional development patterns and the travel mode mix.



Stormwater/Wastewater

Stormwater and wastewater systems are aging throughout the region. Many are more than 100 years old. Increasing permitting requirements for treatment and discharge result in significant additional compliance costs. Sewer providers often can issue bonds secured by existing and future rate increases, providing stable revenue for incremental construction. However, communities face a significant challenge in securing up-front capital as major construction projects, such as new sewer plants or major trunk lines, cannot be added incrementally in a cost-effective manner. Collaboration and consolidation among providers may provide service and cost efficiencies, but are challenging to realize. Siting new sewer facilities is increasingly difficult in light of community compatibility issues and local, state and federal environmental regulations.

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Although stormwater facilities are most effective at the local (watershed) level, solutions to these systems have little to no excess capacity. There are, however, site-specific opportunities for stormwater management solutions such as green streets and open space/stormwater management facilities. These providers share many of the same challenges to implementing capital improvements faced by sewer providers, especially securing reliable funding for long-term maintenance.

Urban parks and open spaces

The availability and cost of land represent the most significant challenges for ensuring adequate parks and open spaces for a growing population. As urban communities increase in density, this becomes both more necessary and more expensive. Given population projections, the region likely will need 5,000 acres of new urban park space and 8,000 acres of open space by 2035. While voters have been generous in approving funding for new acquisitions for parks and open space, funds for maintenance and operations are scarce.



Water

While our region appears to have an existing adequate source of water supply, projected population growth will increase demand. Source development and transmission of water to new users are challenges. Water

conservation, reuse and non-potable use are becoming increasingly important to reduce demand and delay the need to upgrade systems. Securing up-front capital represents the largest hurdle to meeting new capacity demands.

Many water providers use intergovernmental agreements (IGAs) to provide service across jurisdictions, but coordination continues to be a challenge. Water providers will need to work with non-potable water supplier to effectively build and manage a viable system to reuse water when feasible.

SUMMARY OF LOCAL TRENDS

As evidenced by this summary of infrastructure needs and issues, the Portland region lacks a coordinated system for planning, construction and maintenance of the infrastructure required to create great communities. Some challenges, such as the lack of a stable funding source, are common among all service providers and require solutions at the regional level. Other challenges are unique to each provider and may be more appropriately addressed locally.

COSTS AND INVESTMENTS

COSTS

Given current levels of service delivery, the capital needed to accommodate population and job growth in the region through 2035 could run as high as \$41 billion. Total costs include approximately \$10 billion for repairs and reconstruction that would likely be needed even if the region did not experience its projected population growth.

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Figure 1. Local Infrastructure Expenditures by Type

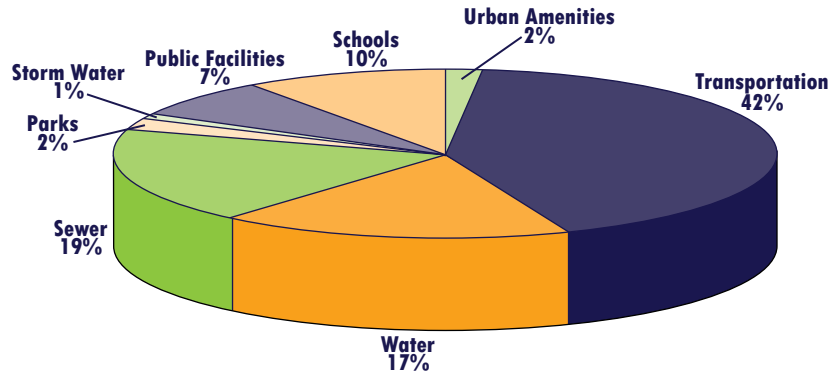


Figure 1 illustrates the allocation of local expenditures by infrastructure type in the Portland region. Transportation is by far the largest expenditure, accounting for 42 percent of local capital improvement plans. Sewer (19%) and water (17%) are the next highest cost items.

For the purposes of this cost analysis, infrastructure is separated into three levels of public investment: local, community and regional. The demand on local infrastructure is directly related to specific dwelling units. Though not necessarily on-site, community

infrastructure may still be attributed to specific dwelling units. Regional infrastructure benefits the entire regional, though it is difficult to establish a nexus between the collective need for regional infrastructure and individual use. Table 1 provides examples of infrastructure at each level.

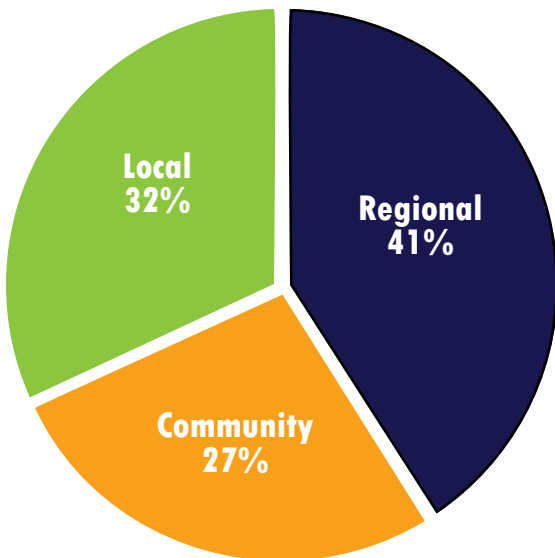
Regional infrastructure costs comprise 41 percent of total costs, followed by local infrastructure, 32 percent, and community infrastructure, 27 percent. Regional facilities are not usually funded by individual jurisdictions or developers.

Table 1. Levels of Infrastructure Investment

Local	Community	Regional
Local streets and sidewalks	Collectors and minor arterials	Major arterials and bridges; transit
Neighborhood parks	Community parks and fields; civic buildings (police, fire, libraries); parking garages	Regional parks, arts and cultural facilities
Household sewer and water collection and distribution pipes	Sewer trunk and treatment; water distribution, treatment and storage	Regional water and sewer facilities
Elementary and middle schools	High schools	Community colleges

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According to an analysis of the 2035 Regional Transportation Plan (RTP) and local transportation system and public facility plans, the 2035 transportation system will cost approximately \$23.7 billion, including approximately \$4.7 billion for preservation/reconstruction and \$19 billion for capacity improvements. Of the \$23.7 billion in transportation investment needed in the region, \$14.2 billion will be needed for local/community facilities and \$9.5 billion for regional facilities.



COST INVESTMENTS

National research demonstrates that public infrastructure in urban settings and compact new development at the edge of existing systems is generally less expensive per unit than in areas with more land-extensive development patterns. Moreover, fragmented development patterns lead to loss of open space and agricultural lands, auto dependence, urban blight and disinvestment, and higher resource consumption.

Furthermore, compact regional development is shown to increase regional economic activity. A study by Joe Cortright, Vice President, Impresa Consulting, asserts that reduced transportation costs of \$1.1 billion to \$1.5 billion per year are tangible benefits of the Portland region's current transportation/land use system. The reduced transportation costs result in \$800 million of additional economic activity in the region that would have benefited oil and auto companies outside the region.³

Case studies examining the cost of redevelopment in five existing urban centers and new development in twelve urbanizing areas in the Portland region found that while public infrastructure capital costs vary depending on specific location and access to existing infrastructure, they generally reflect this national pattern. Some urban case studies had lower costs than urbanizing case studies and vice versa. However, while local and community infrastructure costs per land area is generally higher in urban areas, the cost per job/dwelling unit is lower due to higher development densities. In fact, certain small scale infill development projects may have little or no infrastructure costs.

Urban and urbanizing areas usually have different public infrastructure requirements that vary by location, type, mix and scale of the development. Most urban developments occur where existing public facilities are already in place, but may require upgrading to accommodate increased demand. Projects often have no or little surplus vacant land to utilize for development phasing, and attempt

³ Joe Cortright, Portland's Green Dividend. CEOs for Cities, 2007.

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to optimize the available land with buildings, open space and parking. Parking usually is provided in above- or below-grade structures that are built early in the project and cannot be phased in over time. Many sites available for development in urban areas are “brownfields.” While brownfield sites offer an excellent opportunity for redevelopment and cost savings due to their proximity to existing infrastructure, the potential cost of environmental remediation may make these sites impractical.

In contrast to urban area developments, urbanizing areas often require new public infrastructure or the expansion of existing systems. This often occurs on vacant or “greenfield” land with few constraints. Transportation infrastructure is the most critical investment needed to accommodate growth in these areas, comprising approximately fifty percent of the needed capital costs. Urban areas are generally more readily able to provide transportation, sewer and water services than newly urbanizing areas.



With respect to development density/design and resulting infrastructure demand, a key difference between the urban and urbanizing case studies is the timing of investment. Urban developments tend to require the majority of their infrastructure up-front (usually by year 15)

while urbanizing developments can finance this in phases over many years. Therefore, while initial infrastructure costs tend to be the same or slightly higher in urban than in urbanizing areas, development in urban areas is often less expensive over time.

FUNDING AND FUNDING GAPS

To accommodate growth over the next 30 years, the Portland region will require infill utilities and upgrades to existing systems in urban areas and new systems to serve urbanizing areas. Demands are projected to be relatively consistent across the region, regardless of location. No one area within the region appears to be better prepared to accommodate future growth than another.

Traditional funding sources are expected to cover only about half the estimated \$27 to 41 billion needed to accommodate growth by 2035. Compounding the decrease in federal funding for infrastructure are state initiatives which constrain the ability of local jurisdictions to raise revenue. Measures 5 and 50 place restrictions on property tax rates and increases in assessed property values. Thus, it is highly unlikely that local revenue can keep up with the cost of providing public services over the long term.

Some types of infrastructure, such as water, sewer, electricity and natural gas, are provided through rate-based funding systems. These tend to be stable and predictable because rates can be increased to cover additional costs. However, obtaining large amounts of up-front capital to make major improvements or expand capacity still are significant challenges.

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Non-rate-based infrastructure, such as parks, school facilities, civic structures and transportation, generally do not have significant and stable sources for maintenance and operations and are subject to local budgetary constraints.

Parks and libraries tend to be fairly well supported with local bond levies for capital costs, but usually lack adequate operations and maintenance funding. Public investment in urban parking facilities and amenities such as landscaping, art and lighting are often funded through urban renewal programs or public-private development agreements. The current RTP identifies a \$7 billion finance gap, which would be even higher if the full range of transportation costs to support great communities were identified.



Expanded or new local and community transportation facilities are often funded in part through system development charge (SDC) revenues, which leverage additional private and public investments. Metro's report, *Promoting Vibrant Communities with System Development Charges*, found that assessing differential SDCs in urban versus urbanizing areas can promote greater financial equity and the 2040 Growth Concept by reducing up-front costs of targeted developments. However, most local SDCs

cover only 30-50 percent of the capital costs of local/community roadways or transit facilities. Moreover, they are subject to fluctuations based on the pace of new development, limited to certain types of infrastructure and can fund only capital improvements.

Among the other causes of funding gaps identified by service providers throughout the region are the following:

- Declining state and federal allocations.
- Lack of ongoing, reliable sources.
- Capital investment funds diverted to operating and/or maintenance.
- Funds diverted to unanticipated and/or emergency repairs.
- Rising construction costs.
- Small scale and fragmented development not allowing economies of scale.
- Low tax bases due to limited population size or low household incomes and/or voter reluctance to approve higher taxes.
- Funding adjustments that require political action.
- Lack of public support and/or political will.
- Competitive nature of funding sources based on geography.

PLANNING, DEVELOPMENT AND FINANCE

With a common understanding of the challenges facing the Portland region, the next step is to identify potential solutions to regional infrastructure needs and determine at what level of public investment each solution will be pursued. It is important that the region leverage its successful history of coordination among

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local jurisdictions and the general public to effectively identify and address the highest priorities for providing infrastructure to serve both existing and future residents. Metro, along with other collaborative political bodies, plays a key role in leading a regional dialogue and building consensus. Leadership from elected officials and the private sector, as well as community engagement efforts will be needed to raise public awareness of infrastructure needs and issues and garner support for agreed-upon solutions.

Potential infrastructure planning, development and finance strategies are divided into the following four approaches:

Efficient Service Delivery – Explore ways to provide services more efficiently, decrease costs, conserve resources, and maximize current infrastructure investments.

Demand Management – Examining the need for infrastructure from conservation and land development perspectives can help prevent or delay the need for major capacity investments. Components of demand management include focusing growth to use existing capacity first; pricing usage to reduce and manage demand; educating the public on conservation strategies; and providing incentives to reduce demand.

Innovative Planning and Design – Research and implement innovative approaches to infrastructure planning and design to create vibrant communities. Plan for emerging technologies with potential to improve service delivery.

New Funding – Evaluate and pursue new local and regional funding sources to leverage state and federal investments. Identify and

remove existing barriers to public and private investment.

The following pages outline strategies to address infrastructure needs and issues. A description of each strategy is accompanied by case studies for further clarification when applicable.



EFFICIENT SERVICE DELIVERY

Fragmented delivery systems often result in reduced efficiencies. For service providers, jurisdictional issues and daily operations can be barriers to working with adjacent service providers. Focused coordination among service providers can lead to shared facilities and service delivery, adjusting service areas, merging service districts, and allocating funding responsibilities for community and regional facilities.

Shared Public Facilities

Multiple goals can be met by coordinating public facility needs. Public facilities that serve more than one purpose make efficient use of public money. One way to accomplish this is to combine elements that serve two or more areas of public need. The groups served need not be mutually exclusive. Examples include combining a water reservoir with active park use and building library space inside a City Hall

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building. Underutilized public space can be used for other activities. For example, utility corridors can be opened to public access for recreational use and public parking lots can be used for community gatherings and activities. Creating and developing public facilities that serve exclusive needs at opposite times of the year can be cost-effective. For example, a series of ball fields can double as a regional stormwater facility in the rainy season.

Case Studies

City of Sherwood Snyder Park

The City of Sherwood is in the process of constructing a new four million gallon covered reservoir in Snyder Park. To add to the amenities of this hill-top community park, the reservoir will be built partially underground, with two tennis courts constructed on top.

City of Sherwood Civic Building

The Sherwood Urban Renewal Plan Advisory Commission (SURPAC) recommended co-locating the new library inside the proposed City Hall building. In 2007, Sherwood opened the doors of the new 10,000 SF building to serve a growing population of approximately 16,000. The new facility was built with urban renewal dollars and general fund dollars (proceeds from sale of the Old Library and City Hall buildings). The City Hall includes a public plaza and a courtroom, which also function as a city council room and a community room.

Tualatin Hills Parks and Recreation District

Utilizing existing Bonneville Power Administration (BPA) right-of-way, the Tualatin Hills Parks and Recreation District operates several parks and trails throughout west Beaverton. Plans are underway to complete

the 16-mile trail which runs underneath a BPA line from the Tualatin River north to Portland's Forest Park.

Sunnyside Village Green Park

A collaborative effort between North Clackamas Parks and Recreation and Clackamas County Water and Environment Services, this park is a multiuse facility integrating regional stormwater management with park facilities. The park includes a stormwater detention pond to reduce the rate of runoff in the basin and water quality treatment to stormwater flows. During summer months the dry depression zone serves as an open grass play area and amphitheater. During extreme storm events, water slowly fills the depression providing needed storage with overflows into a tributary to Sieben Creek.



City of Wilsonville

The City of Wilsonville is maximizing the use of open space within Villebois Village. Palermo Park is two acres of active park area including a basketball court and play areas with open lawn spaces and trails. This park also functions as a stormwater treatment facility during the winter months.

Shared Public Service Delivery

Efficiencies can be realized by streamlining fragmented service delivery and infrastructure

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maintenance. Intergovernmental agreements are the most common form of coordination found in the Portland region. However, focused collaboration could lead to redistricting service areas, merging service districts, and allocating financing responsibilities for community and regional facilities. For example, the cities of Wood Village and Fairview have IGAs with Gresham for wastewater treatment and work closely to keep the cost of treatment down and prepare for future system demands. These efforts could lead to strategies that allow service providers to be more efficient with the resources and infrastructure systems that currently exist.



Case Studies

Portland Region

- The City of Portland sells wholesale water to 19 other service providers.
- The cities of Hillsboro, Gresham, Tigard and Portland use intergovernmental agreements (IGAs) for park facilities and services.
- The Tualatin Valley Water District is a partner in water resources and transmission in a venture with the Joint Water Commission, the Willamette River Water Coalition and the City of Portland. In addition, it provides contract water services to the cities of Beaverton and Sherwood, as well as Clean Water Services, Valley View Water District and Southwood Park Water District. The District works with the Regional Water Providers Consortium on regional planning, conservation and emergency preparation plans.
- The North Clackamas Water Commission has IGAs with Sunrise Water Authority, South Fork Water Bureau, and the cities of Gladstone and Lake Oswego for a variety of services.
- Gresham has intergovernmental agreements (IGAs) with Multnomah County to maintain County-owned Vance Park and with Metro Parks & Greenspaces for maintenance of co-owned parcels.
- Clean Water Services has IGAs with seven large cities in Washington County to implement local sewer and stormwater operations and maintenance.
- Gresham has maintenance IGAs with Multnomah County and the Multnomah County Drainage District to provide services for specific stormwater infrastructure.
- Washington County employs IGAs with its cities for roadway maintenance and project funding through both the county-wide Traffic Impact Fee and the Major Streets Transportation Improvement Program. The County works closely with its municipal partners through the County Coordination Committee.
- The City of Milwaukie contracts with Clackamas County to provide traffic signal operations and maintenance.
- During snow and ice events, the effort of clearing roadways across the region is shared among ODOT, PDOT, counties, and smaller cities via a coordinated agreement.

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Equipment Sharing

Large equipment for infrastructure maintenance and construction can be shared among cities and counties to accomplish large projects or provide secondary relief in emergency situations. A regional approach could be taken and be justified on a cost-benefit basis.

Case Study

Portland Region

The cities of Troutdale, Fairview and Wood Village share stormwater equipment.

Regional Coordination

There are many issues that are most effectively addressed at a scale larger than the local level. State/interstate, regional, sub-regional, and local infrastructure needs, costs, and benefits should be clearly defined. Potential collaborators can be identified and solutions developed that are appropriate for the type and size of the need. For example, the need for bridge planning and financing can be addressed regionally if it is agreed that this is a regional priority.

Participating in local advocacy groups or nonprofit organizations offers opportunities to build support for large projects to attain long-term goals. For example, participating in regional meetings can provide smaller agencies or jurisdictions opportunities to spread the word regarding proposed utility changes.

Case Study

Regional Water Providers Consortium

The Regional Water Providers Consortium is a group of 23 water providers that serve Clackamas, Multnomah and Washington counties and Metro. The Consortium provides a forum for collaboration on water supply

issues and conducts activities that provide service to customers in and around the Portland metropolitan area. This includes coordinating implementation of the Regional Water Supply Plan, studying and discussing water supply issues, and promoting cost-efficient use and stewardship of water resources.



Capital Improvement Coordination

Public agencies can benefit from the knowledge of proposed capital improvement plans of various infrastructure entities. Where projects overlap, they can link the construction schedules to eliminate mobilization and clean-up efforts as well as lower the overall costs and public impacts. This strategy can be problematic when services are provided by multiple agencies and funds are available at different times. Case studies are similar to some of those identified under “Shared Public Service Delivery.”

Alternative Standards for Public Construction

Where funds are limited, the public can benefit from specific infrastructure elements that meet health and safety standards, but are of a lesser standard than what is typical for new construction. For example, interim pedestrian trails could be built instead of formal sidewalks on urban streets.

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The increasing cost of energy and the impact it will have on both personal mobility and utility operations will likely lead to changed standards for public construction. For instance, smaller cars will use less space on roads and in parking areas.



Case Study

City of Portland Pedestrian Design Guide

The City of Portland Department of Transportation's (PDOT) Pedestrian Design Guide supplies several alternative designs for constructing pedestrian facilities where the conventional city standards are not feasible. The design guide allows for alternate surfacing materials, widths, and locations for sidewalks that often cost less to design and install. Many have been applied to local improvement district (LID) projects.

Franchise Agreement Consistency

Clear, consistent agreements among private utility providers and similarly sized jurisdictions can save time and money when coordinating public improvements and upgrades. Included in this should be an attempt to treat each utility consistently when participating in large urban projects. A regional governing agency could develop a model franchise agreement. The model franchise agreement could state common conditions, requirements and obligations as well as exceptions where they are appropriate

due to the nature of the infrastructure type or a particular utility provider. The desired result is to realize common expectations among public agencies and utility providers in the region. The benefits may also be a consistent and fair treatment of utility providers, as well as more timely response, better cooperation and less litigation among parties. For instance, clear management of the limited space in the right-of-way can minimize future relocations as improvements and upgrades are performed on existing infrastructure. Furthermore, coordination between energy and other infrastructure providers in advance of development could minimize future relocations and identify alternatives to the right-of-way when limited space will not accommodate multiple utilities, resulting in cost savings for developers and ratepayers.

Oregon Department of Transportation/American Public Works Association Specifications

In 1996, the Governor's Task Force on Transportation Efficiency was assigned the mission of finding new ways to use Oregon's gas tax money more efficiently. Representatives from the infrastructure and construction trades voted to create joint standards. In 2002, the Oregon Standard Specifications for Construction were completed and were updated in early 2008. This document allows construction work to occur across the state under a standardized method and payment system, ensuring that projects receive a consistent quality of construction. The effort also provides cost savings by allowing contractors to use consistent materials and machinery across various jurisdictional boundaries.

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Annexation Planning

Efficiencies can be realized by planning annexation areas along growth corridors and growth centers, including the infrastructure to support this sequencing. Funding mechanisms should be put in place to support growth as it happens, responding to cycles in the economy and housing markets.

Systems Maintenance

Techniques used to assess maintenance needs that can prolong the life of facilities should be expanded.

Case Study

Portland Region

- PDOT's Pavement Management System.
- The City of Portland maintains a software system to conduct asset management.
- Street cleaning frequencies can be adjusted to prolong the life of stormwater piping systems, reducing the maintenance costs caused by debris entering pipes.



Life-Cycle Costing

Considering whole-life costs when making infrastructure investment decisions can reduce long-term costs. One method of implementation is to require life-cycle costing as a criterion for project approval and/or permitting fees.

DEMAND MANAGEMENT

The Portland region needs to examine infrastructure conservation measures to help prevent or delay the need for major capacity investments. Components of demand management include: focusing growth to use existing capacity first; pricing usage to reduce and manage demand; educating the public on conservation strategies and travel options; and providing incentives to reduce demand.

Compact Development Patterns

Compact urban land form (smaller lots and multi-family vs. single family) is a key factor in reducing demands on infrastructure and on water in particular. Continue to promote compact development as a key factor in efficiency for all infrastructure types. Focus on infill and redevelopment in existing urban areas as well as newly urbanizing with close proximity to existing systems targeted for compact, mixed-use and industrial development.

Peak-use Pricing

Infrastructure system capacity or sizing for capacity often is a function of peak demand versus usage. Peak events dramatically increase the demand on infrastructure systems. For example, peak rain events in Lake Oswego can increase the demand for wastewater service up to six times more than the average demand. Most services where peak demand is an issue do not charge for the time of day the resource is used. Conservation is necessary, but pricing measures that reduce overall demand as well as peak demand should be implemented. There are many opportunities to change behavior by reducing or minimizing peak use of a variety

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of services. Leveling out peak demand can be an effective way to reduce infrastructure cost. Peak-use pricing uses real time monitoring systems that charge for the actual amount of the resource used or capacity consumed. This technique could be used for many types of infrastructure, including roadway and water usage. One example is implementing or increasing toll charges during the rush hour (congestion pricing). Another is implementing peak seasonal pricing for water use, including wastewater. The cost of technology used to implement daily peak pricing for water is prohibitive at this time.

Case Studies

Portland General Electric (PGE)

PGE's Critical Peak Pricing (CPP) program provides lower energy rates on non-CPP event days. Businesses can reduce energy bills by shifting energy usage away from peak days and hours.

Singapore

Singapore introduced the world's first congestion pricing program in 1975 and implemented electronic road pricing in 1998. New technology is used to predict prevailing and emerging traffic conditions and adjust pricing accordingly. Congestion charges are part of a comprehensive traffic management effort that includes an annual road tax, fuel taxes, custom duties and vehicle registration fees and investment in public transportation.

Public Education and Resource Conservation

Invest in public outreach efforts to inform the public of the current state of infrastructure in the region. Help people understand the real costs

and benefits of their actions. Provide detailed information on strategies to reduce impacts on infrastructure, including conservation measures to help prevent or delay the need for major capacity investments. In particular, efforts to conserve water and energy and reduce driving could have a significant impact on the need to upgrade existing infrastructure systems. When possible, incentives should be used to encourage conservation efforts, such as lower use of utilities.

Case Studies

Portland Bureau of Environmental Services

The City of Portland provides a discount on sewer charges for properties that disconnect downspouts from the combined sewer system.

Regional Water Providers Consortium

The Regional Water Providers Consortium develops and implements water conservation programs that educate the public about water-related issues. The programs include a summer marketing campaign, website, schools programs, community events and partnerships, and public education and outreach.



Drive Less/Save More Campaign

The Drive Less/Save More Campaign is sponsored by Metro's Regional Travel Options Program, TriMet, ODOT and other public/

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private partners. The campaign seeks to reduce single-person car trips by promoting travel options like public transit, car pooling, biking and walking and encouraging drivers to trip chain or combine multiple errands into single trips. The campaign website provides access to a number of resources at <http://drivelessavemore.com/>.



INNOVATIVE PLANNING AND DESIGN

Traditional infrastructure facilities may be designed and provided in innovative ways that address sustainability and increase community support. Emerging technologies provide opportunities to increase efficiencies and lead to best practices.

Infrastructure Recycling and Reuse

Promote innovative ways to reuse or recycle existing infrastructure. For example, schools or unused transportation or utility corridors that are insufficient to serve one purpose can be used for other purposes to help reduce the need for new facilities to meet expanding demand.

Case Studies

Springwater Corridor

The Springwater Corridor is a former rail corridor; the Springwater Division Line was

developed for rail service in 1903. Much of Springwater Corridor was acquired by the City of Portland in 1990, with additional acquisitions by Metro in the following years. Master planning for the Corridor began in 1991, and involved input from citizens, agencies, organizations, and municipalities, including Portland Department of Transportation; Oregon Department of Transportation; the cities of Gresham and Milwaukie; Metro; Clackamas and Multnomah counties; the 40-Mile Loop Land Trust; and the Johnson Creek Corridor Committee.

Banks–Vernonia State Trail

Recently completed, this is the first “rails-to-trails” state park built in Oregon. It is built on an abandoned railroad bed that stretches 21 miles from the town of Banks to the city of Vernonia. The railway line dates back to the 1920s, when it was used for moving logs and lumber from the Oregon-American lumber mill in Vernonia, and freight and passengers from Keasey to Portland. The line was abandoned and the rails salvaged in 1973. The right-of-way was then purchased by the state in 1974, and transferred to Oregon Parks and Recreation Department in 1990.

Green Infrastructure

Infrastructure innovation is evolving rapidly due to regional planning initiatives, market acceptance of the green building movement and interest in sustainable development. It may be possible to foster regional collaboration and leadership in various fields of green planning, design, engineering and development. An excellent example of this is Metro’s work to foster green street designs to address storm water, urban design and other multiple benefits.

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Examples of regional “green” infrastructure that might be developed include:

- Solid waste management and zero waste and economic development related to recycling industry
- Water conservation and reuse strategies
- Green buildings
- Eco-roofs for open space and storm water management
- Distributed renewable energy
- Waste water treatment systems as sources of bio-nutrients
- Metropolitan food transportation and distribution strategies

Case Studies

Metro Green Street Handbook

Metro’s Green Street Handbook is an example of a green infrastructure initiative that documents the state of the art of stormwater management in the streetscape.



Sustainable Infrastructure Research and Development

Support the evolution of Portland State University (PSU) as a research and development and application center for innovative sustainable infrastructure. PSU

currently houses significant assets that can help the region develop and apply innovative research, development, technological transfer, finance and operation techniques. These resources could potentially be organized into a regional infrastructure innovation center or network. This center could draw on the rich academic resources in civil engineering, transportation, biology, chemistry, energy and mechanical engineering, electrical engineering, nanoscience, urban and regional planning, public administration, business administration, finance and other disciplines to improve the capacity of the region to accommodate future growth.

Case Studies

Canada

The National Research Council of Canada, Center for Sustainable Infrastructure Research (http://irc.nrc-cnrc.gc.ca/csir/index_e.html) is a collaboration of universities, municipal governments and industrial partners in Regina, the Province of Saskatchewan and elsewhere. The collaboration is pursuing a multi-disciplinary research and development program to develop innovative technologies and decision support tools that address the economic, social, and environmental aspects of infrastructure sustainability. This effort will help develop a technology base that will give Saskatchewan a competitive advantage in sustainable infrastructure technologies.

Virginia

The Green Infrastructure Center (www.gicinc.org), in Charlottesville, VA, is a nonprofit organization founded in December 2006 to assist communities in developing strategies for protecting and conserving

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their ecological and cultural assets through environmentally-sensitive decisions, lifestyles and planning. Green infrastructure includes the interconnected natural systems and ecological processes that provide clean water, air quality and wildlife habitat. Green infrastructure sustains a community's social, economic, and environmental health. The Center provides tools to help communities identify the services provided by natural systems, such as enhanced quality of life and economic benefits, and develop strategies to protect and sustain these resources.



Australia

The Natural Edge Project (TNEP) is an independent and highly developed Sustainability Think-Tank based in Australia. TNEP operates as a partnership for education, research and policy development on innovation for sustainable development. TNEP's mission is to contribute to and succinctly communicate leading research, case studies, tools and strategies for achieving sustainable development across government, business and civil society. See: <http://www.naturaledgeproject.net/>

Sustainable Infrastructure Standards

Long-term cost savings can be realized through sustainable infrastructure development.

Sustainable infrastructure standards are evolving based on the strong market recognition of the U. S. Green Building Council's LEED rating system and related developments. Both the American Society of Civil Engineers (ASCE) and American Public Works Association (APWA) have infrastructure programs to support sustainability.

Case Studies

United States Green Building Council (USGBC)

According to the USGBC, LEED for Neighborhood Development integrates the principles of smart growth, urbanism and green building into the first national system for neighborhood design. LEED certification provides independent, third-party verification that the location and design of a project meet accepted high levels of environmentally responsible, sustainable development. The post-pilot version of the LEED ND rating system is expected to launch in 2009.

American Society of Civil Engineers

ASCE and the Canadian Society of Civil Engineers are formulating a joint sustainable development action plan for the profession.

See: <http://content.coprinstitute.org/files/pdf/ASCESustainableDevelopmentActionPlan.pdf>

Emerging Technologies

Plan for and utilize emerging technologies that can reduce costs and increase infrastructure services. Strategies include:

- Planning infrastructure to support the use of electric and other alternative-fuel cars.
- Integrating solar generation infrastructure into the urban form.

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- Constructing facilities designed to generate power, such as systems to capture methane in wastewater treatment plants.
- Use advanced street lighting technology such as LEDs or super-conducting cables.
- Designing water reuse systems that include the use of bio-reactors.
- Utilizing GPS equipment to redistribute peak auto use on congested traffic ways.
- Smart meter technology to allow peak pricing.
- Smart signal systems to manage congestion.

NEW FUNDING

New funding sources are needed to upgrade and replace existing infrastructure systems as well as provide infrastructure to newly urbanizing areas. Communities in the region can support new investment by working together to pay for the infrastructure needed at the local, community and regional levels, and to leverage federal and state investments. This analysis should include identifying and removing barriers to public and private investments in infrastructure. A regional look at financing possibilities for basic infrastructure could help support implementation of the region's 2040 vision. Financing devices need to be put in place upfront by the responsible governments.

Support Federal Legislation

Support development of a national infrastructure plan proposed by Congressman Earl Blumenauer. Work with the regional congressional delegation to develop support for this plan and targeted federal funding. "The legislation calls for a new National Plan to define and finance the infrastructure required

to support a sustainable economy, improve the livability of our cities and rural communities, provide jobs for Americans, and strengthen national security." The bill would create a Commission on Rebuilding America for the 21st Century and a national vision for infrastructure including specific recommendations and a set of model principles to inform future infrastructure investments.



Potential New State Revenue Sources for Oregon

Opportunities for funding community and regional infrastructure facilities, such as roads, bridges, transit systems, and water/sewer facilities should start at the state level, with new funding sources for strategic infrastructure investments identified during the 2009 legislative session. Examples from this region and other jurisdictions follow. Each of these tools has been used in other places, but implementation of any tool has inherent benefits and risks.

- Additional funds for the Oregon Infrastructure Bank to be dedicated to metropolitan areas.
- An expanded role for the Oregon Infrastructure Bank to provide credit-enhancement to local governments and service districts.

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- Funding from the Oregon Strategic Transportation Initiative dedicated to strategic projects in metropolitan areas.
- State transportation project mitigation (traffic impact) fees for strategic regional projects.
- A real estate transfer fee with revenues dedicated to infrastructure.
- An increased Oregon fuel tax and additional revenues dedicated to strategic infrastructure.
- A lodging accommodations tax and dedicated revenues to infrastructure.
- Revenues from the Oregon weight-mile tax and dedicated revenues to regional freight mobility projects.
- An increased Oregon motor vehicle fee with revenues dedicated to strategic regional projects.
- Oregon income tax deductions for businesses and residents located within a designated Center, Corridor, Employment or Industrial area per the 2040 Growth Concept.
- State provisions to allow establishment of Special Benefit Assessment Districts with local taxing authority.

Case Studies

Oregon Special Public Works Fund

The Special Public Works Fund administered by the Oregon Community Development Division is primarily a loan program that provides funding for municipally-owned facilities that support economic and community development. Established in 1985 by the Oregon Legislature, the fund has grown to \$160 million. Loans range in size from less than \$100,000 to \$15 million. Loan terms can be

offered at tax-exempt rates for up to 25 years. Grants are limited to \$500,000 or 85 percent of the project cost, or up to \$5,000 per eligible job created or retained.

Oregon Water/Wastewater Fund

This is a loan and grant program administered by the Oregon Community Development Division to provide for the design and construction of public infrastructure needed to ensure compliance with the U.S. Safe Drinking Water Act or the Clean Water Act. Public entities, municipalities, ports and special districts may apply for funding improvement of drinking water, wastewater, or storm water systems. Loans range in size from less than \$100,000 to \$15 million. Loan terms can be offered at tax-exempt rates for up to 25 years. Grants are limited to \$10,000 per hookup, with a maximum of \$750,000 per project. An applicant is not eligible for grant funds if the annual median household income in the applicant's service area is more than the state average median household income level.

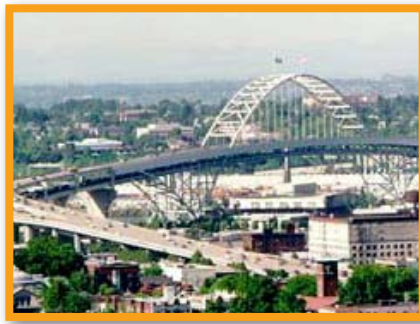


Oregon Transportation Infrastructure Bank (OTIB)

OTIB offers direct loans for eligible projects funded from available resources or through the sale of revenue bonds. Borrowers include cities, counties, transit districts, ports, tribal

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governments, state agencies and private for-profit and non-profit entities. Uses of funding include various transportation and transit projects. Loan terms can include tax-exempt financing with repayment beginning within five years of project completion and must be repaid within 30 years or at the end of the useful life of the project. Projects are selected on a competitive basis with preference given to projects with quick loan repayment. Projects that receive OTIB funds may include federal money which requires the applicants to abide by applicable state and federal laws, rules and regulations including NEPA, Davis-Bacon Act, Buy America, etc. As of January 2005, the Oregon Transportation Commission had approved a \$30 million non-revolving line of credit from the State Highway Fund for the OTIB.



State Transportation Mitigation Fees

Washington State Department of Transportation (WSDOT) allows local jurisdictions (cities and counties) to charge developers for their impacts on state transportation facilities. The WSDOT mitigation fee program has been used to fund the local share for capacity improvements to roadways in Pierce and Snohomish Counties in the greater Seattle Metropolitan Region. The mitigation fee is based on the capital cost of projects identified in the State Transportation

Improvement Program and calculated annually by WSDOT staff. Each jurisdiction has the flexibility to charge the mitigation fee or waive it on a case by case basis. CALTRANS is also now considering a similar approach for funding the local share of strategic state transportation improvements.

Oregon Senate Bill 772, Public-Private Partnerships

In 2003, the Oregon Legislature approved a new bill that provides ODOT with tools to develop public-private partnerships for transportation projects, and raised the limit of funding for this program to \$50 million. While no such partnerships have materialized, this program has the potential for creating opportunities to build large, badly-needed transportation projects.

Oregon House Bill 2278, expansion of ConnectOregon

This bill funds another \$100 million of ConnectOregon through lottery bond sales and authorizes a statewide multimodal transportation study.

Washington Economic Development Finance Authority (WEDFA)

WEDFA can act as the issuing authority on tax exempt Industrial Revenue Bonds to finance eligible infrastructure investments by qualifying public or private entities. WEDFA issues bonds for up to \$10 million on a single project, but does not provide any credit enhancement for borrowers. Washington state securities law requires that each borrower obtain a direct pay letter of credit from a lending institution equal to the principal plus 125 days interest. An alternative to the letter of credit provision is for

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the borrower to work with a lender to arrange a “private placement” of the bond with an institutional investor or banking firm. WEDFA staff can assist with private placement efforts.



California Infrastructure and Economic Development Bank (I-Bank)

State financing authority provides tax exempt financing to public agencies and qualifying private and non-profit entities. Since 1999, the I-Bank has financed more than \$6.5 billion in bonds and loans for economic development and public infrastructure projects. I-Bank also provided more than \$300 million in loans from the Infrastructure State Revolving Fund Program since 2000. I-Bank leverages about \$2.50 in added public and private investment for each \$1.00 it lends. Public infrastructure projects financed by I-Bank include flood control, water, wastewater, public safety facilities, and public streets.

California Proposition 1B

Approved by voters in November 2006, Prop. 1B enacts the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 and authorizes \$19.925 billion of state general obligation bonds for specific purposes. Focus of this program is on high-priority transportation corridor improvements, trade infrastructure and port security projects,

school bus replacement, passenger rail improvements, state/local transportation projects, bridge retrofits, railroad grade separation projects, and traffic safety.

California Proposition 1C

Approved by voters in November 2006, Prop. 1C enacts the Housing and Emergency Shelter Trust Fund Act. Funds are used for providing shelters for battered women and children, low income housing, homeownership assistance, and development programs targeted in urban areas near public transportation. The measure authorizes \$2.85 billion in GO bonds to fund 13 new and existing housing and development programs. Funds are awarded on a competitive basis.

Potential New Regional Revenue Source or Authority

Particularly if federal or state funding efforts do not appear viable, a regional referendum should be considered to seek voter support for new or expanded fees that can be used to leverage state or federal funding to complete strategic infrastructure projects such as bridge construction or preservation, and new roadway, transit, multimodal, and urban amenity projects. If regional funds were to be collected by Metro, it is likely that the Legislature would need to increase Metro’s spending cap. Examples of regional tools used in local and other jurisdictions follow. Each tool has inherent benefits and risks.

- Transportation project mitigation fees or system development charges for strategic regional projects.
- Real estate transfer fee dedicated to strategic regional infrastructure projects (this would be an increase in Washington County).

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- Fuel tax, with dedicated funding for strategic regional projects.
- Lodging accommodations tax, with dedicated funding for infrastructure.
- Motor vehicle fee increase, with dedicated funding for strategic regional projects.
- Expansion and extension of the construction excise tax, with dedicated funding for strategic community or regional infrastructure projects.
- Expanded role for Metro to educate and inform citizens and businesses regarding the benefits of conservation.
- Expanded role for Metro to help coordinate utility district roles and responsibilities in conjunction with service providers.
- Revolving Loan Fund for location efficient mortgages for low and moderate income homebuyers.
- Carbon Impact Offset fee for new buildings that do not meet energy efficiency guidelines.

Case Studies

San Diego

The San Diego Association of Governments (SANDAG) is using innovative techniques to plan and fund their transportation system. A 5 percent sales tax dedicated to transportation improvements has been particularly successful.

Virginia

With the passage of a new transportation act, Virginia is pursuing what appears to be regional financing of transportation that locks together state and local financing of improvements and more regional control of land use. The overall approach allows the regional transportation

authority to levy certain taxes and require that localities do likewise for transportation support. State funds will be tied to regional actions. As part of the transportation plan, Virginia is building “hot lanes” on the interstates that will toll individual drivers that use HOV lanes.



State or Regional Bond Bank

Bond banks are a financial intermediary that provides low cost funds through the sale of tax exempt bonds. Capital financing through bond banks allows borrowers to take advantage of the bank’s high investment grade rating, low interest rates and reduced issuance and post issuance costs. Local governments are shareholders that participate in bank governance and in some cases make minimal stock subscription payments. For more information see the Appendix.

Case Studies

**States of Alaska, Indiana, Maine,
New Hampshire, Vermont
Alberta Province, Canada**

Value-capture finance

Public improvements made today can lead to future increases in economic value. By capturing a share of future increases, these improvements can be made self-financing. Value-capture finance leverages future tax

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receipts to pay for public infrastructure needed to support development for projected growth. In other words, private land value increases generated by new public investment are all or in part “captured” through a land related tax to pay for that investment.

Public and private sectors are constituent elements in the development process. Local government’s role evolves as provider of infrastructure and promoter of development. New applications are possible as governments and private developers find it necessary and desirable to work together. Value-capturing finance shares the benefits and costs among partners so that private benefits are partially invested in public services. Those that benefit from new public investment in infrastructure and services pay for them. Examples include urban renewal districts.

Assessment and Taxation Districts

Special districts assess properties with added charges to recover the cost of special improvements made to them. They are not a burden on the general tax base and do not constitute general indebtedness. Moreover, this technique allows landowners to amortize payments over time. Special districts are a viable source of funding at the local or community level. It can be a challenge to explain this technique to the public. A common type of special district is the local improvement district (LID) where a public amenity is needed. Public agencies can encourage and/or aid the use of an LID to fund specific projects. With this source of private (often via property-owners) funding, many

elements can be completed at little cost to the public agency.

The following are other types of assessment and taxation districts:

- Regional Improvement Districts
- Special Benefit Assessment Districts
- Business Improvement District
- Supplemental SDCs
- Reimbursement Districts
- Urban Renewal Districts

Case Studies

Washington State Local Infrastructure Financing Tool (LIFT)

Established during the 2006 legislative session, the LIFT program provides a new way to support public infrastructure, with focus on job creation and increasing local economic activity. LIFT is a competitive program that allows selected local governments to take advantage of tax revenue generated by new private developments in Revenue Development Areas (RDAs). Much like Oregon’s urban renewal program, LIFT supports RDA’s use of state and local tax increment revenues to repay bonds. Jurisdictions may apply for up to \$2.5 million in annual LIFT authority, and in most cases only one RDA is allowed per county.



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Community Facilities District Act (“Mello-Roos”)

Mello-Roos enabled Community Facility Districts (CFD) to be established by local government agencies in California as a means of obtaining community funding. CFDs are areas where a special tax is imposed on property owners. The CFD has chosen to seek public financing through the sale of bonds for the purpose of financing certain public improvements and services.



Tax Revenues and Fees

Tax revenues and fees could be used to fund new infrastructure. Most taxes require voter approval and would likely be subject to a cap. Tax revenues and fees include:

- Impact Fees, Systems Development Charges
- Utility Charges/Fees (user charges)
- Motor Vehicle Registration Fees
- Fuel Tax (maximum allowed under state laws)
- Utility Franchise Fees
- Developer Connection Charges
- Real Estate Transfer Fee
- Construction Excise Tax
- Lodging Tax
- Toll Revenues
- Mitigation Fees

- Property Tax Levy
- Payroll Tax
- Road User Fee (establish a user fee paid by households, businesses, and industries to fund transportation system improvements and upgrades; similar to Portland Mayor-elect Sam Adams’ Safe, Sound and Green Plan and the street utility fee in Hillsboro).
- Tax Increment Financing (establish a tax increment district to raise the funding for necessary public infrastructure improvements).

Public-Private Partnerships

Public-private partnerships (PPPs) are an effective means to develop infrastructure projects. A PPP is a contractual agreement between a public agency (federal, state or local) and a private sector entity. Through this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for use by the general public. In addition to the sharing of resources, each party shares in the risks and rewards potential in the delivery of the service and/or facility. PPPs can create wide opportunities for deeper funding and sources of creativity.

Successful PPPs have strong political leadership, shared burdens and rewards, commitment to plans, project timetables and clear, realistic funding sources. PPPs can be focused at various scales and structured in different ways (See the Appendix). Some are more applicable to infrastructure needs than others, and some more applicable to particular types of infrastructure. For instance, utilities such as water or sewer that have a user-paid revenue stream are better implemented

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under some models, and road or highway infrastructure that may combine user fees with local, state, and federal capital contributions are better constructed under other models. They are used extensively in Europe, but with mixed success. Metro could develop a “toolkit” to define the range of PPPs and the criteria for success in developing and managing PPPs.

Case Studies

South Waterfront; Portland, OR

The South Waterfront project is a PPP among the City of Portland, the Portland Development Commission, and Oregon Health and Science University. Tax increment revenues and local private cost-sharing was used to provide needed improvements and desired amenities. Development agreements between the city and individual property owners provided a tool for negotiating public and private commitments to meet plan goals on a site-specific basis. PPPs were used to finance some improvements and long-term maintenance of public facilities. For example, local improvement districts assisted with streetcar, tram, parks and greenway installation and maintenance.



Metro

A transit-oriented development (TOD) Program aims to provide built examples of transit-oriented development projects and to

demonstrate the potential of public-private partnerships for making great communities. The TOD program provides financial incentives and uses PPPs to enhance the economic feasibility of higher density mixed-use projects served by transit. The program has contributed to many of the successful TOD developments in the region and has acquired key opportunity sites at transit stations.

Cascade Station, Airport Light Rail Transit; Portland, OR

Bechtel, Trammel Crow, Port of Portland, PDOT, TriMet and PDC partnered to build light rail transit and retail / commercial infrastructure near the Portland Airport. Bechtel provided the private partner’s contribution by constructing the infrastructure in exchange for the right to enter into 99-year leases that would allow private development of the Port’s land. The Portland Development Commission was an intermediary and provided about \$30 million in financing.

Land Acquisition

Investigate new approaches to land acquisition. Land acquisition is a major challenge preventing large scale development projects in the region. A handful of corporations now control the building of large residential housing developments in the United States. There is a need to plan for areas to be annexed by talking to these corporations to understand what large-scale development would look like and how to prepare for it. New approaches to land acquisition include:

- Planning for public transit and development patterns that support it is of particular importance. Obtain rights-of-way before

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development occurs to dictate where linear infrastructure will go.

- Various landowners form a private limited liability corporation to spread costs and benefits and consolidate land for a single developer.
- Public sector uses a tool similar to urban renewal, but to purchase land in urbanizing areas for development purposes.
- Work with developers to get control of parcels with highest value to leverage process.



Patient Equity⁴

Patient equity is the capital committed to a development budget that does not have a defined payback schedule. Patient capital is not a substitute for other financing that sunsets in seven to ten years. Rather, it is additive, layered on top of a conventional development budget such that the overall cost of the project increases. Patient equity pays the increased costs and mitigates the risks of new development. Ultimately, it can facilitate a project's success and over time yield substantial return to its investors.

Patient equity is ideal for financing walkable, mixed-use projects. It allows conventional

equity to take on a proportionally smaller piece of the total development budget. Investors of patient equity in walkable projects are likely to see substantial financial returns as the project matures and critical mass is achieved (ten or more years). However, current methodologies for evaluating equity investments are often biased toward short-term (one to seven years) investment decisions. Many of these methodologies are unable to evaluate cash flows beyond year five, which is when walkable, urban developments see their strongest financial performance. A similar method could be to establish a patient equity fund for long-term investments to be used in public-private partnerships.

Case Studies

Reston Town Center

Mobil Land owned the master planned community of Reston, Virginia, located in the Washington, D.C. metropolitan area. The 200-acre site includes more than one million square feet of office, hotel and retail space, and thousands of condominium and rental apartments. Current rental rates and sales prices demonstrate the premium that Reston Town Center's walkable urbanism commands. There is no direct evidence of how much patient equity was in the project but estimates of patient equity for the first phase of the Town Center are upwards of 50 percent of the development budget.

Century Theatre Block, Albuquerque

The Historic District Improvement Company (HDIC) developed the Century Theatre Block in Albuquerque as the catalytic project starting the revitalization of the downtown. The project consists of a 47,000 square foot, 14-screen

⁴ Source: Leinberger, Christopher B. *The Need for Patient Equity in Creating Great Places*.



movie theater, 25,000 square feet of retail and 25,000 square feet of office space in a mixed-use, walkable form. The HDIC project had a 40% higher construction and tenant improvement budget than the conventional budget. The development budget became 5% conventional equity, 67% debt and 27% patient equity. The cash flows have recently surpassed the conventional projections and seem set to significantly surpass the conventional projections in the future.

AvalonBay Communities, Inc.

AvalonBay REIT concentrates on building and owning rental apartment projects in markets with high barriers to entry. As a result, over half of their portfolio is in walkable, urbane locations. This portfolio has earned AvalonBay a reputation as one of the premier rental apartment REITs in the United States. It has consistently been the most profitable apartment REIT and has provided the highest shareholder return for apartment REITs.

Remove Barriers to Investment

Identify and remove existing legal, regulatory and other barriers to public and private investment in new development and infrastructure. For instance, liability issues associated with superfund sites prevent redevelopment of brownfields due to fear of lawsuit. Unfunded mandates from federal and

state governments also serve as obstacles to investments in infrastructure. Likewise, cities should revisit development codes to encourage investments, removing codes that prevent compact urban development.

Carbon and Ecosystem Service Markets

Due to the impact of climate change, there is a rapidly evolving set of markets in green house gas reduction or sequestration. The United States Congress is considering a national cap-and-trade system that could result in up to \$1 trillion in capital exchange. It is likely that national legislation will pass within the next few years. The Western Governors' Climate Initiative also is developing a regional cap-and-trade system to reduce greenhouse gas emissions and several Oregon leaders are developing a similar concept designed to quantify and monetize the value of services provided by ecosystems and develop the market mechanisms where they can be sold, purchased, or traded. These opportunities are detailed in several presentations at: www.nebc.org/content.aspx?pageid=34

Case Studies

Climate Action Plan Tax, Boulder, Colorado

Boulder voters approved Initiative 202 in 2007, making this the first time in the nation that a municipal government will impose an energy tax on its residents to directly combat global warming. The energy tax is also referred to as a carbon tax since it is based on electricity consumed through the burning of coal which is directly related to carbon or greenhouse gas emissions. The average household will pay \$1.33 per month and the average business will pay \$3.80 per month. The tax will generate

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about \$1 million annually through 2012 when the tax is set to expire. Estimated energy cost savings from this measure are \$63 million over the long term.



Oregon

There are significant efforts in Oregon to develop an ecosystem services market for the Willamette Valley and elsewhere to value and capitalize on ecosystem services provided by nature. Taken together with the emerging cap and trade carbon markets there are and will be major opportunities for funding for energy-efficient infrastructure, compact development and open space “greeninfrastructure” needs of the region. Regional collaboration will be essential to fully participate in both markets.

CRITERIA FOR TARGETING REGIONAL FUNDS

While it is important to pursue strategies in all four categories, the reality is that new funding sources are crucial to providing needed infrastructure. The following matrix outlines a set of regional funding program eligibility criteria. These funding criteria could be applied to ascertain the relative advantages and disadvantages for the aforementioned funding programs, using a relative scoring method for each criterion ranging from 1 (least effective) to 5 (most effective). The highest scoring funding programs should be advanced for consideration by the appropriate legislative body and/or public-at-large.

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Criteria	Evaluation Question to be Addressed	Comments
Legal precedence in Oregon	Is this technique allowed under Oregon law?	
Current use in Portland region	How many jurisdictions or districts use it today? Has it been successful?	
Overall simplicity (easy to understand/convey)	Can it be explained in 20 words or a simple graphic?	Important for public support
Implements 2040 policy objectives	Can funding be focused on centers, corridors, and employment and industrial areas?	
Equity among affected stakeholders	Who pays the cost? Are they the beneficiaries?	
Ease of integration with existing governments	How many inter-agency agreements/modifications will be required?	Important to local agencies
Potential revenue generation	What is revenue generation potential: high, med., low?	Forecast over 30 years
Stability of annual revenues	How much does the revenue stream rely on variable factors, such as construction cycles?	Historical review of revenue system
Ability to be used for annual operations & maintenance	Can the revenue be used for annual operations & maintenance?	Important to local agencies
Flexibility of the revenues	Can the revenue address multiple infra needs?	Flexibility of technique
Annual implementation/administrative costs	What will be the cost of administering this to local governments?	Forecast over 30 years
Ability to leverage federal or state funds	Can this revenue source leverage non-local grants?	Potential for all levels of government
Ability to leverage local public/private funds	Can this revenue source leverage private investment?	Potential for all levels of government
Likely to receive voter approval	Is this the type of program voters generally support?	Important to elected officials
Consistency with other financing techniques used by local governments	How well does it fit in with contemporary patterns?	Helps sell program to citizens

* It is recommended that regional funding techniques be ranked according to these criteria on a scale of 1 to 5, with 1 being least effective and 5 being most effective, and use this as a basis for prioritizing funding programs.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Changing times require new approaches to infrastructure provision and finance. This analysis describes the region's infrastructure challenges and begins to quantify the problem and lay out some options to address the region's infrastructure needs. However, tough questions remain as the region moves forward:

- There will never be enough money for everything – how can we most efficiently guide public investment decisions to strategically target limited resources?
- Can managing demand reduce the need to expand the capacity of infrastructure?
- Are we providing infrastructure services at the most efficient level (geographical or jurisdictional), or are there opportunities to achieve economies of scale or efficiencies?
- How can we best address competing fiscal demands for new infrastructure, maintenance needs, and upgrades of existing facilities?
- Do service providers currently have the capacity to research and share information with counterparts nationally and globally to facilitate the adoption of innovations in service delivery?
- Will incorporating global climate change and sustainability into public messages help manage consumption?
- How can government deepen public understanding of the infrastructure challenges and increase public support for infrastructure finance?

RECOMMENDATIONS

The time is right for decisive action by elected and appointed leaders across the region to address our infrastructure needs.

Recommended actions:

- Coordinate regional partners to identify state legislative changes that would increase our capability to finance regional infrastructure needs.
- Convene regional partners to explore opportunities to implement solutions that increase efficiency and better manage demand.



- Increase public awareness of infrastructure needs and the importance of setting priorities with limited resources.
- Recognize return on investment when making public investment decisions in both urban and newly urbanizing areas.
- Encourage and facilitate implementation of new technologies that increase the efficiency and sustainability of infrastructure systems.