

Mobility

Brief: *Integrating multiple modes of transportation into comprehensive plans improves transportation efficiency and supports environmental sustainability, energy conservation, public health and a prosperous economy.*

Problem

Global climate change is the economic and environmental issue of our lifetime.¹ The science behind climate change is clear. The 2013 Intergovernmental Panel on Climate Change (IPCC) report states, “the science now shows with 95 percent certainty that human activity is the dominant cause of observed warming since the mid-20th century.”² A 2013 review of 11,944 scientific peer-reviewed abstracts on the subject of global climate change written by 29,083 authors and published in 1,980 journals found 97% of the papers accept the consensus position that humans are causing global warming.³

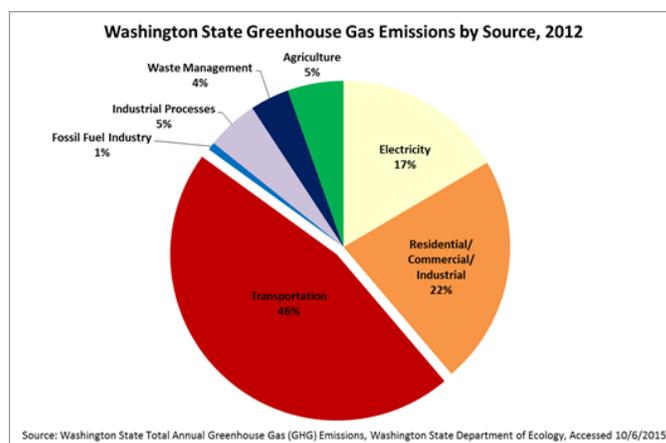
The science is also clear that we must move forward quickly to reduce

¹ [Climate Change 2013: The Physical Science Basis](#). IPCC. Contribution of working group I to the fifth assessment report of the intergovernmental panel on climate change. Cambridge University Press, Cambridge

² [Climate Change 2013: The Physical Science Basis](#). IPCC. Contribution of working group I to the fifth assessment report of the intergovernmental panel on climate change. Cambridge University Press, Cambridge

³ Cook John et al (2013). [Quantifying consensus on anthropogenic global warming in the scientific literature](#). Environ Res Lett 8:024024.

greenhouse gas emissions in order to mitigate its effects.² Without action, climate change will negatively affect nearly every part of Washington’s economy through changes in temperature, sea level, and water availability.⁴



Transportation represents by far the largest share of Washington’s carbon pollution emissions. Cars, trucks and other transportation-related sources accounted for 46 percent of the state’s total greenhouse gas emissions in 2012. Washington must reduce vehicle emissions to achieve significant reductions in overall carbon emissions.⁵

Emissions from vehicles are also one the largest contributors to air pollution in

⁴ [Path to a Low-Carbon Economy: An Interim Plan to Address Washington’s Greenhouse Gas Emissions Executive Summary](#), Washington State Department of Ecology: December 2010, page ES-1.

⁵ [“Cutting Carbon Pollution and Taking Clean Energy Action: Washington Will Lead the Way,”](#) Governor Inslee’s Legislative Affairs and Policy Office: 2.

Washington State.⁶ Fewer trips will lead to less emissions and improved health, especially in minority groups who are exposed to more traffic related air pollution⁷. Exposure to traffic related air pollution exasperates asthma and may also cause the onset of asthma and other respiratory problems, impair lung function and increase deaths from cardiovascular disease and other causes.⁸

Addressing the connections between climate change and transportation will require a broad initiative that deals with mobility, land use, energy and fuels. The magnitude of the climate change problem has provided a new focus on these inter-relationships, reinforcing the idea that potential initiatives in one area must be integrated into an overall approach. As an example, flexible work schedules or telecommuting if implemented alone could be counter-productive if people simply used the resulting free time to take other trips. However, if these measures are implemented in conjunction with changes in land use and economic activity patterns coupled with pricing incentives to reduce VMT, then they begin to take shape as potential components of a coordinated response to climate change.

A national study found transportation efficient land use strategies alone could reduce greenhouse gas emissions by

⁶ 2011 Comprehensive Emissions Inventory Summary Data, Washington State Department of Ecology.

⁷ Residential Proximity to Major Highways – United States, 2010. Morbidity and Mortality Weekly Report. November 2013; 62(3);46-50.

⁸ HEI Panel on the Health Effects of Traffic-Related Air Pollution. Traffic-related air pollution: a critical review of the literature on emissions, exposure, and health effects. HEI Special Report 17. Boston, MA: Health Effects Institute; 2010.

0.3 percent to 2.1 percent by 2050.⁹ Changes in land development patterns coupled with improved transit and transportation options can achieve more notable reductions in greenhouse gas emissions, ranging from 9 percent to 15 percent.¹⁰

A successful approach will require a broad effort to significantly reduce VMT, provide more efficient modes of travel (i.e., transit), provide alternatives that do not require the use of fuel-consuming vehicles (biking, walking), and provide fuel alternatives other than traditional carbon-based sources (electricity, hydrogen, etc.).



Reducing GHG emissions through mobility planning

A multimodal planning approach, especially when combined with land use planning, supports the reduction of transportation-related greenhouse gas emissions. Cities and counties should plan for all transportation modes available in their communities, such as

⁹ [Executive Summary - Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions](#). Cambridge Systematics. July 2009: 7.

¹⁰ [Executive Summary - Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions](#). Cambridge Systematics. July 2009: 8.

walking, biking, driving, sharing a ride, or taking a bus, streetcar, train, boat, ferry or airplane. They should also consider the needs of different types of travelers such as commuters, students, tourists, farmers, and freight haulers.

What are the benefits of mobility planning?

Planning for all the ways people travel improves people's transportation choices and their ability to access jobs, shopping, and services efficiently and safely. Some modes of travel, like walking and biking, can also improve the health and economic vitality of the community and reduce environmental impacts.

Because travelers typically use more than one mode to make a trip, connecting the modes is also important. For example, bus riders are pedestrians for a portion of their travel (e.g. walking to the bus stop from their house). So planning for connected sidewalks and crossings near bus stops is an important step to ensure bus riders can safely access their stops. In fact, good walking and biking connections improve transit ridership as well as walk-on ferry trips. Thinking through how each mode connects to another highlights opportunities to help people travel more efficiently. Park and ride lots that serve vanpools and carpools, railways that regionally connect people with places, and airports that provide access to more distant locations are all important pieces of the overall transportation system. Safe and efficient transportation choices are especially important to youth, seniors, people with low income, and people with disabilities.

Mobility Strategies

There are many ways to integrate planning for walking, biking, driving, transit, and marine and air transport. Outlined below are some options – cities and counties can select the approaches that best fit the context of their community.

Invite Partners

Invite partners responsible for, or interested in, other transportation modes into your planning process. For example, encourage walking and biking advocates, local health and community planning departments, active living groups, regional and state transportation agencies, advocates for seniors and the disabled, schools, transit agencies, trucking associations, and private transportation providers to be involved in your planning process. Review partners' visions, policies, and plans to identify conflicts and opportunities to improve connections.



Adopt Policy Goals

Engage the public and other stakeholders to develop goals and adopt policies that support an integrated, multimodal network. Here are some examples:



- Develop a network of walking and biking facilities that connect residential, employment, community, and regional destinations, rather than stand-alone or spot improvements.
- Provide easily identifiable, safe, comfortable, efficient and universally accessible connections between modes.
- Connect walking and biking facilities to transit stops, transit stations, rail stations, ferry terminals, airports, and park and ride lots.
- Reduce the time it takes walkers, cyclists, and transit riders to reach their destinations by reducing crossing distances, increasing safe crossing opportunities, providing strategic shortcuts, and implementing pedestrian prioritized signal timing at crosswalks.
- Provide adequate amenities to improve safety and comfort at transit stops, transit stations, rail stations, ferry terminals, airports, and park and ride lots (e.g. covered bike parking, street furniture, lighting, drinking water, landscaping, shade, traffic calming).
- Work with transit agencies and private transportation providers to provide frequent, reliable transit, shuttle, and bike/car share and bike/car rental services at rail stations, ferry terminals, airports, and park and ride lots.
- Support the development and expansion of commute trip reduction (CTR) incentive programs to encourage modes of transport other than single-occupancy vehicle.
- Adopt multi-modal concurrency standards.
- Establish local programs to educate citizens on alternatives to automobile use, encourage carpooling and use of transit, and promote walking and bicycling use.
- Provide signage and wayfinding (e.g. transit signage and maps, time-to-destination signage, real-time signage adjacent to stations and terminals, smart technologies, in-pavement markings).
- Encourage economic development opportunities and aviation-related uses adjacent to airports.
- Improve economic vitality by connecting people and goods to regional markets.
- Ensure buses and trains are equipped to transport bikes, especially in dense urban areas.
- Address Americans with Disabilities Act (ADA) requirements when planning walking and biking improvements.
- Incorporate “green road” strategies into road project design and construction, such as recycled materials, local materials, low impact development practices, LED lighting, multimodal accommodations, and electric plug-in stations.

- Manage demand and improve transportation system operations to optimize the performance of existing multimodal transportation infrastructure and services.



Select Performance Measures

- Select performance measures that balance available or planned transportation modes and evaluate the best investments across the network.
- Identify a limited set of key measures to best support goals and objectives, guide investment decisions, and evaluate progress.
- Include both mode-neutral and mode-specific performance measure to gauge total effects on the system and any specific deficiencies in individual modes.
- Build on required performance-based approaches such as state asset management and safety plans, regional congestion management processes, and transit asset management and safety plans.
- Include measures that address both freight and people movement.
- Include measures that consider the mobility and accessibility needs of different members of the community.
- Engage the public and stakeholders to identify the issues that residents care about to ensure measures are

easy to understand and resonate with your community.

- Establish a specific performance target for each measure.
- Establish Vehicle Miles Traveled (VMT) reduction targets, noting the link between VMT reductions and reductions in greenhouse gas emissions.
- Collect baseline data and establish an appropriate time frame for evaluation.
- Provide context for describing performance results. Tell a story and combine data with pictures and interviews to explain performance results.
- Identify and remove institutional and organizational obstacles to performance-based decision making.

Map Existing Infrastructure and Collect Data

- Use models, maps, field surveys and other data collection tools to identify connection opportunities for each transportation mode and gaps in the multimodal network.
- Map walking and biking facilities (e.g. bike lanes, shared use paths, paved road shoulders, sidewalks, crossings), transit and ferry connections (transit stops and routes, transit stations and ferry terminals), rail stations, airports, and park and ride lots.
- Map the street grid and identify freight routes and roadways with high vehicular speeds that would cause safety concerns for bikers and walkers.
- Identify ½-mile walk sheds and 3-mile bike sheds around transit and rail stations, ferry terminals, and airports.

- Identify existing state, regional and local designated walking, biking, transit, rail, and freight routes, including high frequency transit corridors.
- Identify points of interest likely to generate walking, biking, and transit trips (e.g. schools, event centers, public institutions, parks, large employers).
- Identify locations with a history of collisions, identified by mode.
- Collect statistics on average block length, intersection density, walk score, density, employment, and journey to work.
- Assess the existing condition and characteristics of walking and biking facilities, transit stops, transit and rail stations, ferry terminals, and airports.
- Overlay the maps to identify areas that lack connectivity or present other obstacles to travel.
 - Identify opportunities to link transportation facilities in your jurisdiction to those in adjacent jurisdictions.

Identify Strategies and Analyze Alternatives

- Designate which modes have priority on which transportation facilities in your overall transportation network.
- Allocate street space and adjust traffic operations based on modal priorities.
- Evaluate how modal priorities will affect other modes. For example, design roadways prioritized for bikers and walkers for slower vehicle speeds. Conversely, accommodate bikers and walkers on parallel routes where freight is a roadway priority.
- Identify potential transportation system management and operations

strategies such as traffic management and channelization, intersection modification, access management, improved traffic control devices, and parking management.

- Identify potential demand management strategies such as commute trip reduction, rideshare, vanpool, park and ride, telework, and flexible work scheduling.



- Prioritize walking, biking and transit improvements for:
 - Locations with a history of safety problems.
 - Locations expected to generate walking, biking and transit trips, especially those serving youth, seniors, low-income and disabled individuals (e.g. schools and medical facilities).
 - Areas where the community design is supportive (e.g. land zoned for mixed-use and compact development).
 - Transit corridors with frequent service (15 minutes or less).
 - Urban centers, high employment centers, high capacity transit connections, and infill areas.
- Involve the public in identifying and ranking different solutions.

Implement the Plan

- Develop a work plan and agreements with other agencies to implement solutions.
- Implement walking and biking improvements in conjunction with the development of other roadway or transit improvements.
- Develop a plan to communicate with customers (e.g. use branding to identify frequent transit services, provide signage and wayfinding, distribute walk and bike route maps).
- Provide real-time travel information to the public for all modes.

Supportive Community Design

Where communities locate residential, employment, community, and regional destinations and how building, parking and street infrastructure are designed make a big difference to people's transportation choices. For example, people walk and bike more often if their desired destinations are within walking and biking distance. People take buses, ferries and trains more often if there are stops near where they live and work. Compact, mixed use growth brings destinations closer together and encourages walking, biking and transit.

Community design factors that encourage active transportation include:

- Structures facing the street.
- Structures built in relationship to street-width that creates a feeling of enclosure.
- Visually appealing block faces with minimal blank wall space.
- Elements that define pedestrian space, such as art, landscaping or pavement type; and pedestrian weather protection structures.

- Careful consideration of access points and circulation, to ensure safety for all modes.

It is also important to engage your community to develop an understanding of the linkage between land use and transportation policy, regulatory, and funding decisions.

Supportive Street Network

A grid-style street network (streets connect to other streets instead of dead-ending) and short blocks lengths improve accessibility for all modes by reducing the distance people travel to reach their destinations. Considering walking, biking, driving and transit needs when planning street operations also helps to optimize the network for the most efficient travel.

In urban environments:

- Connect street networks where gaps exist.
- Where streets connections are infeasible, at least provide walking and biking paths where appropriate.
- Prevent the use of cul-de-sacs and dead ends in new developments, with few exceptions.
- Adjust traffic operations strategies in a corridor (e.g. traffic signal timing) to favor high priority modes, including walking in urban areas.
- Acknowledge there will be traffic congestion at intersections and look at broader indicators of transportation performance. Planning community transportation systems solely based on vehicular delay negatively affects the viability of other modes.

Considerations for Rural Areas

While rural areas may not have as many or as frequent freight and passenger transport options as more populated centers, the benefits of multimodal planning are significant. Directing compact growth to small town centers with nearby housing makes walking and biking easier and supports small town economies. Coordinating rural transit services provided by public, nonprofit, tribal or private entities can improve service coverage and reduce duplication. Rural transit services include fixed-route transit service in small urban areas, intercity bus service connecting rural communities, paratransit service for rural areas, (especially for elderly or disabled residents), vanpool programs, and specially tailored services such as farm worker shuttles. Rural areas may also benefit from planning to improve farm-to-market connections (truck, rail, and water) and to serve tourism and recreational transportation needs. Park & Pool lots at rural crossroads and participation in regional trails planning and implementation efforts are other rural strategies to enhance additional modes.

Considerations for Freight

Freight transportation systems, including roads, bridges, highways, railroads, pipelines, ports, factories, warehouses, and terminals are critical to supporting and growing jobs, regional domestic products, and a larger tax base. Our multimodal freight transportation system allows business in Washington to compete effectively in regional and global markets.



When planning for freight transportation, consider:

- How freight loading and unloading affects bike lanes and car access.
- Improving intermodal connections and access to ports, truck terminals, distribution centers and rail yards to help freight transporters get to their destinations more freely and quickly, alleviating freight congestion on our roads and improving our economy.
- Discouraging development encroachment at intermodal freight terminals.
- Adjusting delivery windows to remove freight vehicles from peak hour congestion (e.g. allowing night delivery).
- Developing urban freight facilities (e.g. urban freight distribution centers, local freight stations, or designated delivery parking areas).
- Encouraging the use of bikes, electric vehicles, or other low-impact strategies for deliveries made on last mile trips.
- Designating different routes for freight traffic than those routes prioritized as bicycle, pedestrian, and transit corridors.



Examples

[Everett Evergreen Way Revitalization Plan](#). A plan to transform a strip commercial highway by developing mixed use nodes around bus rapid transit stations using land use strategies (new zones and rezoning), capital investments, development incentives and transportation improvements.

[Bellevue Pedestrian and Bicycle Implementation Initiative](#). A complement of action-oriented strategies to advance the projects and programs identified in Bellevue's Pedestrian and Bicycle Transportation Plan.

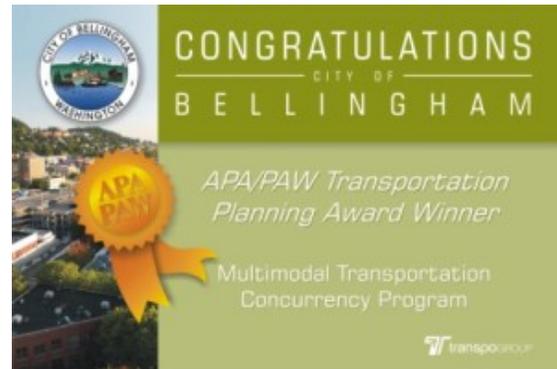
[Bellevue Transit Master Plan](#). A tool to better align city and transit agency planning by identifying a frequent transit network and developing service-oriented strategies (e.g. stop spacing, speed of service, frequency of service) and capital-oriented strategies (e.g. development standards, pedestrian and bicycle environment, transit stops).



[Bellevue Transportation Element](#). This element tailors level of service standards based on community goals and the context of mobility management areas that reflect street patterns and connectivity, available mobility options,

topography, development patterns, and land use objectives.

[Bellingham Complete Networks](#). An approach that uses multimodal concurrency measures to support planning for a multimodal transportation system including bicycle, pedestrian, transit, multi-use trails, vehicle and freight components.



[Issaquah Transportation Element](#). Prioritizes non-motorized and transit-oriented mobility improvements and design elements and uses traffic impact fees and pedestrian and bicycle mitigation fees to address the impacts of development on the multimodal transportation system.

[Issaquah Walk 'n' Roll Plan](#). A comprehensive, action-oriented strategy addressing corridor-level pedestrian and bicycle design and project prioritization, capital and programming components, and policy development.



[Kirkland 10 Minute Neighborhood Analysis](#). A tool to help the community talk about what it means to be livable, walkable, sustainable, connected, and transit-oriented.

[Lacey Woodland District Plan](#). Used a visual preference survey with automated polling to develop a plan to transform an old suburban office park into a vibrant urban setting that resulted in new street standards giving higher priority to walk, bike, and transit access; and updated site and building design standards.

[Redmond Transportation Master Plan](#). Addresses each major element of a complete multimodal transportation system for Redmond including plans for the street system, transit system, pedestrian system, bicycling system, parking, transportation demand management, and freight mobility.

[Shoreline Transit Oriented Development](#). A community-based subarea planning process to address future land use, transportation, and neighborhood enhancements for two future light rail station areas.

[Sustainable Thurston Plan](#). A regional planning process involving extensive community outreach which articulates a shared vision, sets goals and targets, and recommends actions to achieve them including an urban corridor and centers approach.



[Seattle Pedestrian Master Plan](#). A data-based approach to pedestrian planning designed to focus resources in areas where there is high pedestrian demand, safety concerns, and populations with the greatest need.

[Whatcom County Smart Trips](#). A partnership between local government, public agencies, employers, and schools to promote transportation by walking, bicycling, sharing rides, and riding the bus.

Long-term Strategies

- Provide more transit service
- Provide better walking and cycling infrastructure
- Create greater density in land use

[Vista Field Redevelopment Plan](#). A master plan to redevelop a former airport site in hear heart of Kennewick into a mixed use urban village that includes a mix of high to medium density residential homes with small scale neighborhood and destination commercial and cultural uses.



[Kendall Yards](#). Redevelopment of a former rail yard overlooking the Spokane River into a high density, mixed use neighborhood within a short walk from Downtown Spokane. <http://www.kendallyards.com>

[Wenatchee Waterfront Subarea Plan](#). A plan to connect downtown Wenatchee to the Columbia River trail system by redeveloping the former industrial area into a high density mixed use district. <https://www.wenatcheewa.gov>

[Downtown Colville US-395 Context Sensitive Design Project](#). A partnership between WSDOT and the City of Colville to address freight mobility needs while contributing to a healthy and vibrant downtown business district. http://contextsensitivesolutions.org/content/case_studies/wa_colville/



Resources

General

- [Active Community Toolkit](#) (Washington Department of Health)
- [Bicycling in Washington](#) (WSDOT)
- [Community Context Tools](#) (Center for Transportation and the Environment)
- [Complete Streets Local Policy Workbook](#) (Smart Growth America)
- [Complete Streets Policy Analysis](#) (Smart Growth America)
- [Complete Streets Ordinances](#) (Municipal Research Service Center)
- [Context Sensitive Solutions](#) (FHWA)

- [Demand Management – A Primer for Transportation Planners and Engineers](#) (WSDOT)
- [Building Healthy Places](#) (ULI)
- [Designing Walkable Urban Thoroughfares: A Context Sensitive Approach](#) (ITE)
- [Integrating Demand Management into the Transportation Planning Process: A Desk Reference](#) (FHWA)
- [Integrating Operations into Planning and Programming](#) (FHWA)
- [Parking Spaces/Community Places: Finding the Balance through Smart Growth Solutions](#) (EPA)
- [Pedestrian and Transit-Friendly Design: A Primer for Smart Growth](#) (EPA)
- [Restructuring the Commercial Strip: A Practical Guide for Planning the Revitalization of Deteriorating Strip Corridors](#) (EPA)
- [Smart Growth and Transportation](#) (EPA)
- [Transit Supportive Planning Toolkit](#) (PSRC)
- [Urban Bikeway Design Guide](#) (NACTO)
- [Urban Street Design](#) Guide (NACTO)
- [Walking in Washington](#) (WSDOT)

Performance Measures

- [Community Vision Metrics Web Tool](#) (FHWA)
- [Evaluating Complete Streets Projects: A guide for practitioners](#) (AARP)
- [Guide to Sustainable Transportation Performance Measures](#) (EPA)
- [Livability Index](#) (AARP)
- [Model Long-Range Transportation Plans: A Guide for Incorporating Performance-Based Planning](#) (FHWA)

- [Performance Based Planning and Programming Guidebook](#) (FHWA)
- [A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning](#) (FHWA)
- [Practitioners Guide to Incorporating Greenhouse Gas Emissions into the Collaborative Decision-Making Process](#) (TRB)

Maps and Data

- [EJSCREEN](#) (EPA)
- [OnTheMap](#) (U.S. Census)
- [Smart Location Mapping](#) (EPA)
- [WalkScore](#) (Walk Score)
- [WSDOT Community Planning Portal](#) (WSDOT)

Identifying and Analyzing Strategies

- [Streetplan](#)
- [Streetmix](#)

Rural Areas

[Smart Growth in Small Towns and Rural Communities](#) (EPA)

Freight

[Freight Transportation](#) (WSDOT)