

## Appendix F: NewMobility Hubs

### I. NewMobility Hubs—project overview

**NewMobility Hubs transform existing park and ride lots and transit centers into high-tech multi-modal hubs** where travelers can charge their electric cars, board a bus or train, meet rideshare partners, check out a shared bike or car, and make decisions based on real-time traffic and transit information. Fully developed, NewMobility Hubs also incorporate transit-oriented development features such as telework centers, workforce housing, and mixed use retail to help support sustainable communities.



**Exhibit 1.** Information technology, clean energy, sustainable transportation, and smart-growth principles are integrated to provide multimodal options and connections as depicted in this conceptual drawing of a fully developed NewMobility Hub at South Kirkland Park and Ride, in the SR 520 corridor.

**SR 520 Medina to SR 202: Eastside Transit and HOV Project (Eastside Project) will include NewMobility kiosks**, the first step toward the vision of a fully developed NewMobility Hub network. Eight NewMobility traveler information kiosks will be strategically placed throughout the cross-Lake Washington travelshed.

**Kiosks and related IT infrastructure are the backbone of the NewMobility Hub concept and lend themselves to rapid deployment.** Kiosks will be both “hot” with electric vehicle charging stations and “smart” with touch screen access to advance IT services. Placed at the center of four parking spaces and augmented by solar panels,

commuters can charge their electric vehicles or access traveler information. The integration of existing sources of transportation-related information along with the development of new applications encouraged by an open platform (like Apple iPhone applications) can be deployed rapidly while layering additional services now and in the future. The NewMobility network will be scalable and ready to implement in national and international locations.

**Leveraging regional expertise of the Puget Sound region in software and systems,** custom applications could be created for the NewMobility Hub network relatively quickly to provide additional value to users. There are endless data types (electric vehicle stations locations, traffic conditions, alternate routing, dynamic travel times, carbon footprint reports, *et cetera*) that could be delivered to mobile devices in real-time.



**Exhibit 2.** NewMobility kiosks would serve as beacons for next-generation transportation by linking smart cars, traffic conditions, transit, the electricity grid, and infrastructure.

**SR 520 travelers will benefit from a range of products and services** empowering commuters to:

- Plan a trip on-line, from home, at work, in a car, or via mobile devices through the integration of existing technologies.

- Make travel choices using real-time information including traffic congestion, toll prices, transit arrival times, and available car-shares.
- Find vanpool and carpool partners through a ride matching system and save time using new high-occupancy vehicle (HOV) lanes.
- Charge their electric vehicle or reserve a parking spot.

Ultimately, commuters would also be able to purchase regional commuting products such as Good-to-Go tolling transponders and ORCA (One Regional Card for All) regional transit cards.

**NewMobility Hubs provide a unique public/private partnership opportunity** among governmental agencies (Federal Highways Administration, Federal Transit Administration, US Department of Energy, and US Department of Housing and Urban Development) and private sector competitive arenas. It extends Ford Motor Company/Microsoft's SYNC software platform to integrate vehicles, electricity grid, transportation data, and infrastructure.



**One of the first in the United States, this network uses clean energy electric vehicle-to-grid technology**, improving on NewMobility Hubs recently introduced in Hong Kong, Germany, France, and Brazil. Washington State plans to extend this scalable NewMobility network throughout its urban areas.

**NewMobility Hubs would help meet national greenhouse gas reduction goals, create green jobs, and advance energy independence.** The network offers greener commute options and expands the use of electric vehicles in the Puget Sound region. The program builds upon the success of the USDOT's Urban Partnership Agreement and the federal energy grants for transportation electrification awarded in the Pacific Northwest. NewMobility Hubs also support the West Coast Green Highway Initiative by encouraging the use of alternative fuel vehicles.

## II. SR 520 cross-Lake Washington corridor NewMobility Hubs—partnerships for sustainable transportation options

### NewMobility in the cross-Lake Washington travelshed

Although the SR 520 and I-90 Lake Washington floating bridges are separate facilities, these parallel crossings act together as highly interdependent, critical components of the Puget Sound transportation network that links greater Seattle with its heavily populated suburban cities<sup>1</sup>. As with any true network, management techniques employed and improvements made to one component of the network (i.e., SR 520) affects all interdependent parts (i.e., I-90), as well as the network's overall performance capabilities. For purposes of Puget Sound regional mobility, the SR 520 and I-90 bridges are two sides of the same coin: the cross-Lake Washington travel corridor. NewMobility Hub principles recognize and capitalize on these network effects, using advanced technology

<sup>1</sup> Exhibit 3 shows parallel bridge crossings on Lake Washington.

to aggregate network-wide transportation information to help commuters identify optimal travel options across Lake Washington<sup>2</sup>.

## **SR 520 NewMobility Hub builds upon successful partnership with USDOT**

The benefits of using innovation and technology to improve mobility in the Cross-Lake Washington corridor were recognized in USDOT's award of the [Lake Washington Congestion Management Project](#). Through an Urban Partnership Agreement between WSDOT, King County and the federal government, this project will improve cross-Lake Washington traffic through tolling, traffic management technology, transit and telecommuting<sup>3</sup>. While each of the elements of the Lake Washington Congestion Management Project will provide additional travel options and help improve traffic congestion, NewMobility Hub technologies empower people to make decisions from among these mobility options.

## **Real-time travel information for optimizing bridge crossings**

Currently, many commuters choose their bridge crossing based on traffic reports broadcast during morning or afternoon television or talk/radio shows. The ability to provide real-time traffic information to commuters while they are en route will enable better travel choices and provide a more efficient Lake Washington crossing on both the SR 520 bridge and parallel I-90 bridge. By using the SYNC software platform developed by partners Microsoft and Ford Motor Company, this information is available directly in the vehicle, as well as at home, work or via mobile devices.

## **Ensuring Value-for-Money for cross-Lake Washington commuters**

As is well established, the imposition of tolls on a facility will result in some level of diversionary travel, depending upon the toll price and congestion on the alternative route. The SR 520 project will utilize open road, variable rate tolling. The ability to quickly and accurately inform drivers of current prices, congestion levels and estimated travel times will enhance their ability to make optimal travel choices based on these factors, rather than falling back on entrenched habits or incorrect assumptions. NewMobility Hub technologies will not only enable informed buying decisions by providing current toll prices, but also offer pricing and travel-time comparisons among all available transportation modes: available car-shares, local or express transit, HOV lane travel, light rail, commuter rail, *et cetera*. The NewMobility Hubs deployed in the SR 520 corridor will provide the first Value-for-Money mobility comparison capabilities in the nation, if not in the world.

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<sup>2</sup> This TIGER grant proposal is concentrated in the SR 520 corridor, but includes deployment of kiosks at transportation hubs in the roughly 5-mile cross-Lake Washington corridor, to take advantage of network effects.

<sup>3</sup> The Lake Washington Congestion Management Program is federally funded and part of the [Lake Washington Urban Partnership \(UPA\)](#), a cooperative agreement to employ innovative traffic management tools for improving traffic flow on the major corridors surrounding Lake Washington.

## **Clean, Green & Smart<sup>4</sup>: advancing zero carbon transportation in the cross-Lake Washington corridor**

A compelling component of NewMobility Hubs is the deployment of electric charging infrastructure, battery-electric vehicles, and vehicle-to-grid technologies. This is particularly important in the Puget Sound region, where 47 percent of all greenhouse gas emissions come from the transportation sector (as compared to the national average of 26 percent emissions from the transportation sector).

Park and ride facilities at strategic locations in the Puget Sound transportation network can be transformed into NewMobility Hubs with vehicle fleets and support for transportation electrification (Exhibit 3). Although several park and ride facilities in the greater Puget Sound region are excellent candidates, two facilities that directly impact travel in the cross-Lake Washington corridor are identified and targeted in this TIGER grant application: the South Kirkland Park and Ride (Location (1)), and the Eastgate Park and Ride, which is near I-90 but is a key facility in the cross-Lake Washington travelshed, and has important mobility impacts for the SR 520 corridor (Location (5)).

NewMobility Hubs in these locations, with their supporting infrastructure, vehicle fleets (both public and private) and kiosk-based, “smart-grid” technologies, build upon and advance transportation electrification grants awarded and projects underway in Washington State, but especially concentrated in the Puget Sound region. With the preponderance of electric vehicle infrastructure already slated for the cross-Lake Washington corridor, NewMobility Hubs will provide commuters with access to charging facilities and, importantly under this grant proposal, access to Ford battery-electric vehicles that would take advantage of NewMobility Hub features and the attractive potential market for electric vehicle purchasers in one of world’s premiere high-tech centers.

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<sup>4</sup> [Clean, Green & Smart](#) is an initiative developed by the Cascadia Center, elements of which are now in use by several state transportation departments. Also, this term perfectly captures the essential components of NewMobility Hubs, including clean energy imperatives for the transportation sector.



**Exhibit 3.** Potential locations for NewMobility Hubs and NewMobility kiosks serving the cross-Lake Washington corridor.

**Exhibit 4.** Candidate NewMobility Kiosk and Hub Site Characteristics, by Location

Potential Locations within 520 travelshed		Current Site Characteristics
1	S. Kirkland Park & Ride (Kirkland)	596 spaces
2	Redmond Park & Ride (Redmond)	385 spaces (12 )
3	Univ. of Washington Station (Seattle)	
4	Capitol Hill Station (Seattle)	
5	Eastgate Park & Ride (Bellevue)	1,614 (3 )
6	Issaquah Highlands Park & Ride (Issaquah)	1,000 spaces (14 )
7	Bellevue Transit Center (Bellevue)	
8	King Street Station (Seattle)	
9	Colman Dock Ferry Terminal (Seattle)	
10	Westlake Center Station (Seattle)	

**Key:**

- No free parking at or near the facility
- Electric vehicle recharging spots available
- Bike racks or lockers on site
- Amtrak & Sounder Passenger Trains
- Sound Transit Express bus service
- Light Rail station (\*under construction)
- Washington State Ferry terminal

### III. Project and partner description

#### Stage 1: Cornerstone of a larger regional network of fully-developed NewMobility Hubs

The complete NewMobility Hub project is an ambitious plan to create a network of transportation hubs connecting existing transit with future infrastructure and technology. These hubs serve transportation and related energy needs while providing key information technology services to the community. Full development throughout the entire Puget Sound region would occur in stages.

The SR 520 TIGER grant would fund Stage 1 which is the critical foundation for full development because it would deploy the technology and vehicle to grid architecture. Funding for Stages 2 and 3 will be sought through grants and public-private partnerships.

#### Foundational Deployment and Cross Lake Washington Demonstration Project:

Stage 1	Multiple deployments of eight information and electric vehicle charging Kiosks, development of IT services, purchase of 13 electric vehicles.  Located to serve the SR 520 cross-Lake Washington travelshed
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#### Future Expansion and Deployment

Stage 2	Demonstration project to convert an existing park and ride to a complete NewMobility Hub, enhance IT services, encourage entrepreneurs to create additional applications through an open platform, and purchase electric vehicles  One location will be selected based on suitability to travelshed requirements and local demand. Possible sites include park and rides in Bellevue, Everett, and Tacoma.
Stage 3	Extend the network of NewMobility Hubs throughout the region, converting additional park and rides and constructing purpose-built NewMobility Hubs, enhance services, begin scaling the concept for national and international applications, and purchase electric vehicles  Additional locations will be selected to meet demand in Bellevue, Everett, and Tacoma sites not selected for Stage 2 with the goal of forming a crescent of hubs around the urban center

## IV. Budget for NewMobility Project for SR 520

Tasks	Amount
Construction and installation of 8 Smart Kiosks	\$400,000
Electric vehicle acquisition of 13 Ford vehicles including: <ul style="list-style-type: none"> <li>• 4 shuttles</li> <li>• 4 electric transit connect vehicles</li> <li>• 5 Ford Focus electric cars</li> </ul>	\$935,000
Research and training Integrated Smart kiosk hardware/software plug-and-play system design and development NewMobility kiosk system reliability characterization and modeling Workforce training in battery technology, cloud computing, and system reliability	\$1,550,000
Consultation for platform and cloud services	\$115,000
Information technology multimodal support including: Software development; server support (INRIX uses MSFT server license); mobile distribution; target Microsoft, Apple, Blackberry and Android platforms; add-on option to add directions for up to 50,000 users; kiosk application development; vehicle API development (agnostic API for use with all electric cars)	\$4,000,000
Construction project management, monitoring, and reporting	\$135,000
<b>TOTAL</b>	<b>\$7,135,000</b>

## About our Partners

### Ford Motor Company

Ford Motor Company, a global automotive industry leader based in Dearborn, MI, manufactures or distributes automobiles across six continents. With about 224,000 employees and about 90 plants worldwide, the company's core and affiliated automotive brands include Ford, Lincoln, Mercury, Volvo and Mazda. Ford Motor Company launched an aggressive plan to bring pure battery-electric vehicles, next-generation hybrids and a plug-in hybrid to market quickly and more affordably during the next four years. Ford is committed to deliver the best or among the best fuel efficiency with every new vehicle it introduces and to make fuel efficiency solutions affordable for millions of customers. Ford plans to introduce in North America during the next four years: a new battery-electric commercial van in 2010, a new battery-electric small car in 2011 to be developed jointly with Magna International, and next-generation hybrid vehicles, including a plug-in version by 2012.

### INRIX

INRIX is the leading provider of real-time, historical and predictive traffic information using innovative technologies to ensure successful navigation and traffic-enabled solutions. INRIX delivers traffic and information from connected services platform to mobile devices, portable navigation, connected vehicles and location-based applications aggregating over 2 billion GPS data points per month for accuracy. INRIX routing and traffic data save time and money by providing real-time information that allows for green routing, traffic avoidance and incident awareness to minimize travel times and decrease

fuel and energy consumption – technology that will be configured and expanded to serve electric vehicles and charging station locations to help people drive smarter. The INRIX Connected Services platform is fully built-out, available now, ideally suited to quickly integrate the NewMobility Hub objectives and sufficiently flexible to accommodate the goals of the program. INRIX already delivers connected car solutions to the Ford SYNC program.

## **University of Washington**

As a leading research institution, the University of Washington (UW) is a key driver for innovation and economic development, fostering a culture of innovation that drives the Puget Sound region's knowledge-based economy. Within the NewMobility Hub project, the UW will work with industry and government partners to ensure optimized design and reliability of smart kiosks and IT infrastructure while educating the workforce to enter this emerging field. The UW will help define the plug-and-play system architecture to allow rapid incorporation of new innovations while avoiding the risk of technology obsolescence, develop the IT tools, design the integrated sensor and actuator system, and ensure systems operational reliability. To achieve workforce development for job creation in the field, a certificate program curriculum will be developed to meet the growing demands of an electric vehicle infrastructure. An online option will be available to a wider audience as the technology scales beyond regional applications.

## **Cascadia**

Cascadia Discovery Institute is an important force in regional transportation and sustainable development issues in the Puget Sound region. To promote U.S. efforts to reduce reliance on foreign oil, Cascadia has worked to develop and integrate flex-fuel, plug-in, hybrid-electric vehicles. Cascadia was instrumental in bringing together transportation leaders, public officials, and partners to refine the NewMobility Hub Program. Cascadia launched the NewMobility Hub concept at an annual Microsoft co-sponsored "Beyond Oil-Transforming Transportation" conference. Cascadia is co-hosting another conference with Microsoft and the Department of Energy Clean Cities Program to highlight the latest in plug-in hybrid electric vehicle (PHEV) technology. In collaboration with top experts, researchers, and automakers, Cascadia continues exploring how best to integrate plug-in hybrid electric vehicles into the electric power grid and how to help accelerate the production of PHEVs.

## **Microsoft**

A global company in over 100 countries, Microsoft is the worldwide leader in software, services and solutions that help people and businesses realize their full potential. Microsoft is working with partners, customers, suppliers, governments and leading environmental organizations to apply the power of software and information technology to support environmental sustainability and improve energy efficiency. Microsoft collaborated with Ford to develop "Ford SYNC," a factory-installed fully integrated in-car communications and entertainment system. Ford SYNC debuted in the fall of 2007 on 12 different 2008 models of Ford, Mercury, and Lincoln vehicles. By the end of 2009, Ford will install SYNC on all vehicle models. SYNC with Traffic, Directions and Information provides personalized, real-time traffic and road information to help drivers get to where they're going with the information they need.