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Metro | *Agenda*

Meeting: Metro Technical Advisory Committee

Date: Wednesday, November 16, 2011

Time: 10 a.m. – 12 p.m.

Place: Metro Regional Center, Council Chambers

Time	Agenda Item	Action Requested	Presenter(s)	Materials
10 a.m.	**CALL TO ORDER / ANNOUNCEMENTS**	Information	Chris Deffebach, Chair	none
10:15 a.m.	**1. Industrial Site Readiness** *Objective: Provide MTAC with an update on project, including Phase 1 findings*	Information	Ted Reid, Kirk Olsen (NAIOP)	In packet
11:00 a.m.	**2. Climate Smart Communities Scenarios – Preliminary Results and Findings** *Objective: MTAC input on policy questions to be raised for MPAC and JPACT discussion*	Discussion	Kim Ellis, Nuin-Tara Key	In packet
12 p.m.	**ADJOURN**			

MTAC meets on the 1st & 3rd Wednesday of the month. The next meeting is scheduled for December 7, 2011.

For agenda and schedule information, call Alexandra Roberts Eldridge at 503-797-1839, email: Alexandra.Eldridge@oregonmetro.gov. To check on closure or cancellations during inclement weather, please call 503-797-1700#.

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Metro | *Memo*

Date: November 8, 2011

To: MTAC

From: Ted Reid, Metro Land Use Planning

Re: Industrial site readiness project update

Background
Traded-sector companies sell goods and services to buyers outside of the Metro region, bringing additional wealth into the region. Attracting and retaining traded-sector industrial companies is important for the Portland region's long-term economic prosperity. Because the Portland region must compete with other metropolitan areas to attract these firms, it must be able to provide a reasonable inventory of development-ready sites. While providing large industrial sites (over 25 buildable acres) is not the only means to traded-sector job creation, a diverse supply of development-ready sites is important to the region's ability remain competitive in global markets.

The Project
To better understand the barriers to development of the region's supply of large industrial sites, Metro has partnered with the Port of Portland, the Portland Business Alliance, the National Association of Industrial and Office Properties (NAIOP), and Business Oregon to conduct a market-based study. For this study, staff from these agencies and organizations have served on a project management team with Group Mackenzie conducting the analysis.

There are two phases of this project. In Phase 1 of the project, an inventory of vacant large parcels zoned for industrial use was developed. The inventory identified the development constraints and market readiness of these parcels. This work began in June 2011 and concluded in October 2011. Phase 2 will identify 10 strategic sites in the region for more detailed site analysis. This will include outlining a development scenario for each site, defining investments and actions needed to bring these sites to market readiness, and summarizing the economic benefit associated with these investments. This work will occur between November 2011 and February 2012.

The deliverable of the two-phase project will be a report which will provide a better understanding of the need for policy actions and investments to support economic development goals and make efficient use of lands inside the urban growth boundary. This report will support the regional economic development strategy and help ensure our region can retain and attract the industries critical for job and investment growth; inform the work of local jurisdictions, Greater Portland, Community Investment Initiative Leadership Council, Metro, Port of Portland, and the State; and lay a foundation for innovative financing tools and approaches needed to make sites ready for traded-sector investment.

Phase 1 methodology
In establishing the inventory of market-ready industrial land, the project management team looked at all vacant industrial parcels inside the UGB and several Urban Reserves using Metro's 2009 Buildable Lands Inventory as a base. Metro's inventory was supplemented with land inventories from local governments in the region. Sites that have the potential for redevelopment were also identified using a methodology that assesses land and improvement values. However, potential redevelopment sites have not been included in the tiered inventory due to the preliminary nature of the analysis. Further study of redevelopment sites in the region is merited.

Using the buildable land inventory, the first step was to identify single-owner parcels with 25+ vacant acres and opportunities for multiple-owner aggregation to achieve 25+ acre parcels zoned or planned industrial. These gross-acre parcels were evaluated for on-site development constraints (e.g., wetlands, flood plain, slope) to determine net developable acres.

Parcels that are user-owned and held for future development (e.g., Intel, Genentech, Providence) were removed from further analysis. These parcels are being held (land banked) by their owners and not available to the general market.

These sites were then analyzed and put into one of three tiers based on their market readiness. Factors used to determine tiers included infrastructure needs, brownfield status, annexation requirements, land assembly needs, transportation conditions, and availability (for lease or sale, or owner being willing to transact):

Tier 1: Market ready in less than 180 days
Tier 2: Market ready in 7 to 30 months
Tier 3: Over 30 months to market readiness

Phase I findings
56 sites were identified in the Metro region that are larger than 25 net acres and are zoned, concept planned, or designated for future industrial uses. The inventory is summarized in a matrix, which is included in the meeting packet. As noted, these 56 sites do not include potential redevelopment sites, sites held by users for future business expansion, or sites in the three-county area that are outside of Metro's jurisdictional boundaries.

- There are 9 Tier 1 sites that are, or can be, shovel ready within 6 months.
- 5 of the 9 Tier 1 sites have broad marketability.
- There are few 50+ and 100+ acre sites in the region and only 2 of these sites are Tier 1.
- Tier 2 and 3 sites have multiple development constraints that will require significant investments and policy actions to make them development-ready.
- All but 4 of the sites are located in Multnomah County and Washington County.

<u>Tier 1 site findings</u>
The region's immediate inventory of Tier 1 sites includes 9 sites that are, or can be, shovel ready within 6 months or 180 days. 5 of these Tier 1 sites have broad marketability. There is only one 100+ and one 50+ acre site within this Tier 1 category.

<u>Tier 2 site findings</u>
The mid-term inventory of Tier 2 sites that can be shovel ready in 7 to 30 months requires investments and policy actions to bring these sites to market. There are 16 Tier 2 sites in the Metro region. Four of these sites are not in single ownership and require land assembly. There are no sites of 100+ acres and only 4 sites of 50+ acres within this Tier 2 category.

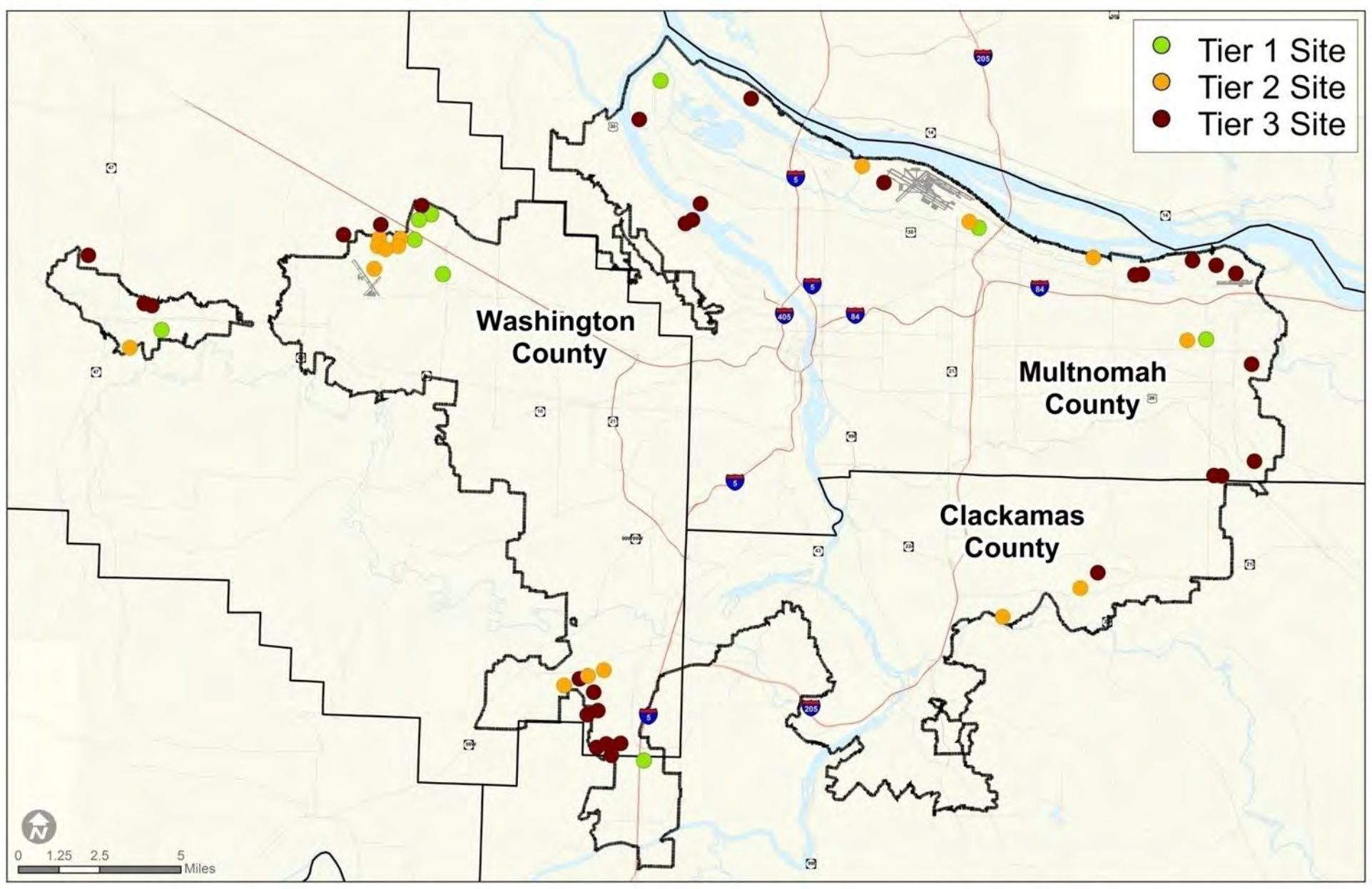
Tier 3 site findings

The pipeline of industrial sites in the region - Tier 3 sites requiring more than 30 months to development readiness - includes 31 sites with multiple challenges requiring significant investments and policy actions such as annexation. Ten of these sites require land assembly involving multiple owners. There are 6 sites of 100+ acres and 4 sites of 50+ acres. Three Tier 3 sites are outside the UGB (located in Urban Reserves) and will be considered for inclusion in the 2016 periodic review process. Three Tier 3 sites are located in the Lower Willamette Superfund area which means complex cleanup, uncertainty, high costs and delay to market readiness.

Conclusions

Phase 1 of the project confirms that investments and policy actions are needed to make more sites development ready to accommodate traded-sector employers. Tier 2 and Tier 3 have a broad range of potential development constraints associated with them that limit the region's ability to attract new employers. To make more of these sites development ready, recommended actions include:

- Brownfields/cleanup;
- Natural resource mitigation and permitting;
- Infrastructure improvements (sewer, water, storm);
- Transportation improvements;
- Acquisition of parcels for land assembly; and
- Legislative actions, including annexation, concept planning, and UGB expansion.


Tier 1 Site
Tier 2 Site
Tier 3 Site
Washington County
Multnomah County
Clackamas County
0 1.25 2.5 5
Miles

REGIONAL INDUSTRIAL LAND INVENTORY - November 7, 2011

SITE CHARACTERISTICS																												INFRASTRUCTURE			TRANSPORTATION				AVAILABILITY/OWNERSHIP							
Site ID	Preliminary Tier	State Certified	Traded-Sector Industry	Owner/Site	Location	County	Gross Acres	Wetlands (RLIS)	Wetland Acreage (Jurisdictions)*	Flood 96 Acres (RLIS)	FEMA Flood AC (RLIS)	Floodplain AC (Jurisdictions)*	Streams AC (RLIS)	Stream AC (Jurisdictions)*	7-25% Slope Acres (RLIS)	10-25% Slope Acres (Jurisdiction/RLIS)*	All Constraints (RLIS)	Alll Constraints (Jurisdictions)*	% Constraints (RLIS)	% Constraints (Jurisdictions)*	Net Developable Acresage (RLIS)	Net Developable Acreage (Market Knowledge)*	Use Restriction	Brownfield	Annexation Required	Number of Taxlots	Number of Owners	Sewer Score	Water Score	Storm Score	Surrounding System Quality	Access to Interstate Highway	Access to Freight Route (Roadway)	Access to Freight System (All Modes)	Currently for Sale/Lease	Willing to Transact	Private Ownership	Investor	Public	User	Site I D	Notes
1	1	YES	C, D, H	RIVERGATE (PORT)	PORTLAND	Multnomah	51.25	0.00		0.21	43.20	0	0.00		0.02	0	43.24	0	84.36%	0.00%	8.02	43.15				5		A	B	A	A	B	A	A	L				YES		1	Lease only
11	1		D, H	PORTLAND INTERNATIONAL CENTER - EAST (PORT)	PORTLAND	Multnomah	43.50	0.34		0.00	0.00		0.79		1.19		2.32		5.33%		41.18					2		A	A	A	A	C	A	B	L				YES		11	Lease only
21	1		A, B, D, F, H, I	LSI EAST (PORT)	GRESHAM	Multnomah	115.98	0.00		0.00	0.00		0.00		0.96		0.96		0.83%		115.01					6		A	A	A	A	B	A	B		YES			YES		21	Delineation # 11-0203; no jurisdictional wetlands on site
32	1		F	ELLIGSEN RALPH H & SHIRLEY L	WILSONVILLE	Clackamas	32.34	0.00		0.00	0.00		0.00		0.00		0.00		0.00%		32.34					1		A	A	A	A	C	B	B	S		YES				32	Price constrained: currently not at industrial price; No further wetland investigation warrented - per DSL
44	1		D, F	INTEL CORPORATION	HILLSBORO	Washington	31.39	0.00	0.00	0.00	0.00	0	0.00		1.28	0	1.28	0	4.08%	0.00%	30.11	31.39				3		B	B	A	A	A	A	B	S					YES	44	Irregular site shape; can not get square/rectangle net developable 25 acres; No further wetland investigation warrented - per DSL
46	1	YES	D, F	DEV. SERVICES OF AMERICA (WESTMARK SITE)	HILLSBORO	Washington	30.02	0.00	0.00	0.00	0.00	0	0.00		1.02	0	1.02	0	3.40%	0.00%	29.00	30.02				1		A	B	A	A	A	A	B	S		YES				46	Delineation # 07-0165: valid for 5 years. New delineation required in March 2012; No further investigation warrented - per DSL
48	1	YES	A, F	WAFFORD DEWAYNE (BAKER/BINDEWALD SITE)	HILLSBORO	Washington	50.78	0.00	1.48	0.00	0.54	0.05	0.78		8.86	0.47	9.40	3.84	18.51%	7.56%	41.38	46.94				1		A	B	A	A	A	A	A	S		YES				48	Delineation # 08-0396; Wetland acreage provided by DSL; No further wetland investigation warrented - per DSL
49	1	YES	A, F	NIKE FOUNDATION	HILLSBORO	Washington	73.88	0.98	0.98	0.00	6.84	13.75	1.13		0.35	0.04	7.16	14.02	9.69%	18.98%	66.72	59.86				1		A	B	A	A	A	A	A	S			YES			49	Wetland acreage provided by City of Hillsboro; Wetland delineation expires April 2012; No further wetland investigation warrented - per DSL
57	1	YES	D, F	MERIX CORPORATION	FOREST GROVE	Washington	34.25	0.66		0.00	0.00		0.00		0.30		0.83		2.42%		33.42					1		A	A	A	A	A	B	C	S					YES	57	Delineation # 06-0248; no further site investigation warrented - per DSL
9	2		D, H,	NE MARINE DR & 33rd AVE (PORT)	PORTLAND	Multnomah	66.74	4.61	0.60	1.86	16.48	18	1.56		11.25	0	26.84		40.22%		39.89	26.84				1		A	A	A	B	C	A	B	L				YES		9	Lease only; requires transportation improvements; Located in managed floodplain
13	2		D, H	ICDC LLC	PORTLAND	Multnomah	28.11	0.00		0.00	0.00		0.00		5.24	1.59	5.24	1.59	18.63%	5.66%	22.87	26.52				3		C	A	A	A	C	B	B	L			YES		NO	13	Local Wetland Inventory does not exist; Site lacks wetland delineation; 100% hydric soils on site and on site wetlands are expected by DSL; Based on wetland findings site may fall below 25 net developable acres
22	2		A, B, D, F, H	LSI WEST (PORT)	GRESHAM	Multnomah	87.69	0.00	3.70	0.00	0.00		0.67		23.77	15.45	24.40		27.82%	17.62%	63.29	68.60				3		A	A	A	A	B	A	B		YES **			YES		22	Multi year farming leases on propety require buy out resulting in Tier 2; No longer a brownfield; Net developable acres is only south of sloped hill; Delineation # 11-0203; Wetland acreage provided by DSL; Per DSL, approximately 1 acre of wetland exists in net developable area on south portion of the site; No further site investigation warrented - per DSL
29	2		C, D, H	CLACKAMAS COUNTY DEVELOPMENT	CLACKAMAS	Clackamas	61.93	0.00		1.85	6.71		3.82		26.47		32.32		52.20%		29.60	40.00		A		11		B	B	B	B	B	B	C	S/L				YES		29	Can mitigate brownfield within 6 months (completed phase 2 assessment); Development Agency estimates net developable 40 acres; Tier 2 because wetlands analysis and mitigation plan requires more than 180 days and not shovel ready within 180; No further wetland investigation warrented - per DSL
38	2		D	BILES FAMILY LLC	SHERWOOD	Washington	39.60	0.00		0.00	0.00		0.00		8.72		8.72		22.01%		30.89				YES	1		C	A	B	B	B	B	B	S		YES				38	No further wetland investigation warrented - per DSL
40	2		D	PACIFIC REALTY ASSOCIATES LP	TUALATIN	Washington	26.80	0.00		0.00	0.00		0.00		2.95	0	3.04	0	11.34%	0.00%	23.76	26.80				1		A	A	A	B	B	A	A	S/L			YES			40	Needs intersection improvements. Permit timing > 6 months; No further wetland investigation warrented - per DSL
50	2	YES	A, F	KEITH BERGER / HERBERT MOORE / BOYLES TRUST	HILLSBORO	Washington	72.40	0.00	0.07	0.00	7.16	5.78	0.00	1.88	0.86	0	8.02	6.26	11.08%	8.65%	64.38	66.14				5	3	B	B	A	B	B	B	B	S		YES				50	Known SNRO on site; Required extension of Huffman Rd for site access is greater than 6 month timeline; Wetland delineation reconcurred 11/09; Wetland acreage provided by DSL; No further wetland investigation warrented - per DSL; North portion of Moore parcel is included as part of this site; 2 property owners
52	2	YES	A, F	BERGER PROPERTIES / HERBERT MOORE	HILLSBORO	Washington	52.00	0.00	0.00	0.00	0.00	0	0.00		0.00	0	0.00	0	0.00%	0.00%	52.00	48.10				2	2	A	A	A	B	C	B	B	S		YES				52	Gross acreage includes area designated for Huffman Rd extension and net developable acresage does not; Required extension of Huffman Rd for site access is greater than 6 month timeline; Southern portion of Moore parcel is included as part of this site; 3 property owners
54	2		D, F	5305 NW 253RD AVENUE LLC	HILLSBORO	Washington	38.49	0.75	1.01	0.00	8.34	7.25	0.00		2.47	0	9.08	9.9	23.59%	25.72%	29.41	28.59			YES	1		B	B	B	C	C	B	B		N/A	YES				54	Willingness to transact is unknown
55	2		B, D, F	SPOKANE HUMANE SOCIETY	HILLSBORO	Washington	45.49	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0	0.00		0.00%	0.00%	45.49				YES	1		C	A	C	C	C	B	B		YES	YES				55	Known SNRO on site; Multiple owners own this parcel but listed as 1 LLC; could be aggregated with site 56 for a 116 acre site
56	2		A, F	EAST EVERGREEN SITE	HILLSBORO	Washington	71.11	0.00	5.16	0.88	0.00	0.00	0.00		0.44	0	0.88	7.26	1.24%	10.21%	70.23	71.11			YES	9	7	C	A	B	A	C	B	C	S	YES	YES				56	Floodplain and SNRO on site; Net developable acres assumes mitigated floodplain and SNRO; 9 parcels/7 property owners; 6 parcels/4 owners currently for sale; Remaining owners have in past expressed willingness to transact; could be aggregate with site 55 for a 116 acre site
62	2		D, F	ROCK CREEK SITE	HAPPY VALLEY	Clackamas	40.83	0.00		0.00	0.00		0.00		6.65		6.65		16.29%		34.18					5	2	C	B	B	B	C	B	C	S	YES	YES				62	2 parcels currently for sale; remaining parcels are willing to transact to aggregate a larger site; 2 property owners and 5 parcels
63	2		D	WOODBURN INDUSTRIAL CAPITAL	FOREST GROVE	Washington	25.10	0.30		0.10	0.75		0.00		0.00		0.98		3.90%		24.12	25.10				1		A	A	A	A	C	A	A	S/L		YES				63	Net developable acres assumes floodplain and wetland mitigation
66	2		D, F, H	ITEL, KENNETH	TUALATIN	Washington	46.25	0.00	0.00	0.00	0.00	0.00%	0.00			1.58	1.58		3.42%		44.67				YES	2		A	A	B	C	B	B	C		YES	YES				66	Desginated as Manufacturing Business Park; falls under commercial services overlay in SW Concept plan
67	2		Aviation	PORTLAND INTERNATIONAL CENTER - WEST (PORT)	PORTLAND	Washington	69.45	6.22	3.80	0.00	0.00	5.95	2.74	0.00	18.16	0.74	21.16	10.49	30.47%	15.10%	48.29	58.96	YES			5		A	A	A	A	C	B	B		YES			YES		67	Lease only; Aviation use only
68	2		Aviation	HILLSBORO AIRPORT (PORT)	HILLSBORO	Washington	39.22	0.00	5.07	0.00	0.00		0.00		0.00		0.00	5.07	0.00%	12.93%	39.22	34.15	YES			1		A	A	C	A	A	A	A		YES			YES		68	Lease only; Aviation use only
2	3		C, D, H, stc. marine	TIME OIL CO	PORTLAND	Multnomah	43.50	0.00		35.32	2.21		0.24		4.47		37.62		86.48%		5.88	25.00		C		2		A	A	B	B	A	A	A	S					YES	2	Net developable is less than 25AC but assumes cut/fill balance can be achieved
4	3		C, D, H	ESCO CORP	PORTLAND	Multnomah	37.62	0.00		0.00	0.00		0.00		13.78	4.29	5.10	4.29	13.57%	11.40%	23.13	33.33		C		6	3	A	A	A	A	A	A	A		NO				YES	4	3 property owners; 6 parcels
5	3		C, D, H	ATOFINA CHEMICALS INC	PORTLAND	Multnomah	59.76	0.00		5.49	8.87	13	0.49		13.78		11.05	13	18.49%	21.76%	48.71	46.76		C		6		A	A	A	A	A	B	B		NO	YES				5	
6	3		D	MC CORMICK & BAXTER CREOSOTING	PORTLAND	Multnomah	42.39	0.00		4.57	2.24	8	1.10		6.97		8.27	9	19.50%	21.23%	34.12	33.39		C		1		C	C	B	B	A	A	C		NO	YES				6	Poor truck access because of severe slope hill
7	3		C, Marine	WEST HAYDEN ISLAND (PORT)	PORTLAND	Multnomah	472.00															404.00	YES		YES	2		B	B	B	C	C	A	B		NO			YES		7	Marine use only; Gross and net development acres are taken from Metro's Large Lot Inventory. Data is not available to explain the net development acreage from this source. This site is entirely constrained by floodplain.
10	3		Aviation	SW QUAD (PORT)	PORTLAND	Multnomah	212.56	0.50	0.00	0.07	106.63	53	0.99		28.35	5.11	118.82	59.10	55.90%	27.80%	93.74	206.47	YES			5		B	A	A	B	C	A	B		YES			YES		10	Lease only; Aviation use only; Net developable acres assumes floodplain mitigation. 10% slope and streams acreage is subtracted from net dev acreage; Located in managed floodplain
15	3		D, H	BT PROPERTY LLC (UPS)	GRESHAM	Multnomah	51.45	0.00	0.00	0.00	5.14	9.77	0.00		5.36	0	9.10	9.77	17.69%	18.99%	42.35	49.45				4		A	A	A	A	B	A	A		NO				YES	15	In managed floodplain; net developable acres assumes complete mitigation strategy (> 6 month timeline); drainage ditches (2 acres) to remain; On site investigation warrented by DSL; No delineation on site and 100% hydric soil)
16	3		D, F, H	CEREGHINO MICHAEL	GRESHAM	Multnomah	41.63	1.28	0.00	26.37	36.80	0	0.92		3.49	0	41.05	0	98.60%	0.00%	0.58	25.00				5		A	A	A	B	A	A	A		NO	YES				16	In managed floodplain; net developable AC assumes complete mitigation strategy; On site wetland investigation is warrented - per DSL
17	3		D, H	TRIP - PHASE 3 (PORT)	FAIRVIEW	Multnomah	34.14	0.13	4.14	0.00	0.00		0.00		4.47	0	4.60	4.14	13.47%	12.13%	29.55	30.00				1		C	B	A	B	A	B	B	S/L				YES		17	
18	3		A, D, H	TRIP - PHASE 2 (PORT)	TROUTDALE	Multnomah	42.25	14.94	12.07	0.00	0.00		0.00		4.38	0	19.02	12.07	45.00%	28.57%	23.24	30.18				2		A	A	A	A	B	B	C	S				YES		18	
19	3		A, D, H, I	TRIP - PHASE 2 (PORT)	TROUTDALE	Multnomah	81.10	26.34	19.64	0.00	0.00		0.00		20.46	0	39.92	19.64	49.22%	24.22%	41.18	80.34				1		A	B	A	A	B	B	C	S				YES		19	Net developable acres assumes complete mitigation strategy
23	3		F	MT HOOD COMMUNITY COLLEGE	TROUTDALE	Multnomah	38.40	0.00		0.00	0.00		0.00		12.72	1	12.72	1	33.13%	2.60%	25.68	37.40		X		3		A	A	B	A	C	B	B		NO			YES		23	Mt Hood Community College will retain ownership; Future use is undetermined - Per conversation with VP of Administration; Potentially anEnvironmental Clean up Site (Metro database) and level of clean up unknown
24	3		D, F	JOHNSON E JEAN	GRESHAM	Multnomah	37.17	0.00		0.00	0.00		0.00		3.34		3.34		9.00%		33.82				YES	1		B	C	B	A	C	B	B		YES	YES				24	No interchange near site
25	3		D	JONAK LESTER JR	GRESHAM	Multnomah	34.22	0.00		0.00	0.00		0.00		12.70	7.15	12.70	7.15	37.12%	20.89%	21.52	27.07			YES	1		C	C	B	B	C	B	B		N/A	YES				25	No interchange near site
26	3		D	DANNAR CHARLES	GRESHAM	Multnomah	27.93	0.80	0.00	0.00	0.00		0.00		5.90	0	6.26	0.00	22.43%	0.00%	21.66	27.93			YES	1		C	C	B	A	C	B	C		N/A	YES				26	No interchange near site
28	3		D	SIRI JAMES F & MOLLIE	HAPPY VALLEY	Clackamas	26.40	0.00		0.00	0.00		0.00		1.13		1.13		4.29%		25.26					2		A	A	A	B	C	A	A		NO	YES				28	Owner is not willing to transact
33	3		C, D, F, H, I	COFFEE CREEK INDUSTRIAL AREA - site 1	WILSONVILLE	Washington	85.23	0.30	1.00	0.00	0.00		0.00		1.64		1.94	4.89	2.28%	5.74%	83.29	80.34			YES	21	17	A	A	A	B	A	A	A		NO	YES				33	17 property owners; ability to aggregate has not been discussed; anchor site for Coffee Creek industrial development - per City of Wilsonville
34	3		C, D, H	VAN'S INVESTMENT LTD	WILSONVILLE	Washington	52.79	4.50	N/A	16.48	16.48		0.00		16.17	6.05	29.35	24.85	55.59%	47.07%	18.56	25.50				1		C	C	B	C	B	A	A		N/A	YES				34	Area does not have slope and wetlands data available from City of Wilsonville; Net developable acreage is challenged because of slope.

Site ID	Preliminary Tier	State Certified	Traded-Sector Industry	Owner/Site	Location	County	Gross Acres	Wetlands (RLIS)	*Wetland Acreage (Jurisdictions)**	Flood 96 Acres (RLIS)	FEMA Flood AC (RLIS)	*Floodplain AC (Jurisdictions)**	Streams AC (RLIS)	*Stream AC (Jurisdictions)**	7-25% Slope Acres (RLIS)	*10-25% Slope Acres (Jurisdictions/RLIS)**	All Constraints (RLIS)	*All Constraints (Jurisdictions)**	% Constraints (RLIS)	*% Constraints (Jurisdictions)**	Net Developable Acreage (RLIS)	*Net Developable Acreage (Market Knowledge)**	Use Restriction	Brownfield	Annexation Required	Number of Taxlots	Number of Owners	Sewer Score	Water Score	Storm Score	Surrounding System Quality	Access to Interstate Highway	Access to Freight Route (Roadway)	Access to Freight System (All Modes)	Currently for Sale/Lease	Willing to Transact	Private Ownership	Investor	Public	User	Site I D	Notes
35	3		C, D	TONQUIN INDUSTRIAL AREA	TUALATIN	Washington	49.70	0.83	0.50	0.00	0.00		0.15		9.18		9.73	9.40	19.58%	18.91%	39.97	40.30			YES	8	7	B	C	B	B	B	A	A		YES				YES	35	Property owners have expressed willingness to aggregate - per City of Tualatin
36	3		B, C, D	TIGARD SAND & GRAVEL SITE	TUALATIN	Washington	296.88	9.33		0.00	0.00		1.02		163.71		168.78		56.85%		128.10				YES	15	3	C	C	B	C	B	A	A		NO				YES	36	Tigard Sand & Gravel ownes 12 parcels
37	3		D	ORR FAMILY FARM LLC	SHERWOOD	Washington	96.26	4.20		0.00	0.00		0.00		49.60		53.42		55.50%		42.84				YES	1		C	A	B	C	B	B	A		NO	YES				37	Preparing for spring 2012 annexation
47	3		D, F	CRANFORD JULIAN F & SHARON D	HILLSBORO	Washington	28.51	0.44	0.44	0.55	2.32	0.52	0.00	0.50	5.63	0.47	7.93	1.22	27.82%	4.28%	20.57	27.29				1		C	B	B	A	A	A	A		NO	YES				47	Combination of hydric and partially hydric soils present; On site wetland investigation warrented - per DSL
59	3		C, D, H	COFFEE CREEK INDUSTRIAL AREA - site 2	WILSONVILLE	Washington	46.37	0.00	0.00	0.00	0.00	0.00	0.00		0.10		0.10	0	0.22%		46.27				YES	12	8	B	B	A	B	B	C	B		NO	YES				59	8 property owners; ability to aggregate has not been discussed
60	3		C, D, H	COFFEE CREEK INDUSTRIAL AREA - site 3	WILSONVILLE	Washington	29.65	0.00	0.00	0.00	0.00	0.00	0.00		2.60		2.60	0	8.77%		27.05			X	YES	10	7	B	A	A	B	B	C	C		NO	YES				60	7 property owners; No expressed willingness to aggregate; Site includes parcels that are split by County lines; Potential underground storage tank on site but exact location is unclear (Metro database); UST could be also located in parcel 61 to the north
61	3		C, D, H	COFFEE CREEK INDUSTRIAL AREA - site 4	WILSONVILLE	Washington	48.56	0.00	0.00	0.00	0.00	0.00	0.00				0.00	0	0.00%		48.56				YES	12	8	B	A	A	B	B	B	C		NO	YES				61	8 property owners; No expressed willingness to aggregate
64	3		D	WOODFOLD-MARCO MFG INC (East Oak St)	FOREST GROVE	Washington	25.46	0.00		0.00	0.00		0.00		0.00		0.00		0.00%		25.46					2	2	B	B	B	A	C	A	C		NO	YES				64	
65	3		D	WOODFOLD-MARCO MFG INC (West Oak St)	FOREST GROVE	Washington	53.93	0.02		0.00	0.00		0.00		0.00		0.02		0.04%		53.91					5		B	B	C	A	C	A	C		NO	YES				65	
100	3		A, B, D, F	HOLZMEYER RICHARD HENRY ET AL	FOREST GROVE	Washington	111.37	0.00		0.00	0.00		0.00		11.63		11.25		10.10%		100.12				YES	1		C	--	B	A	C	C	B		N/A	YES				100	Water service information was not available at the time of this analysis
101	3		A, B, F	VANROSE FARMS and VANDERZANDEN	HILLSBORO	Washington	270.5	18.45		9.08	27.34	22.85	12.14		29.99	23.41	35.77	45.67	13.22%	16.88%	234.73	224.83			YES	2	2	C	B	B	B	C	B	B		YES	YES				101	Aggregated per C of Hillsboro request; On site wetland investigation is warrented - per DSL
104	3		A, B, F	HILLSBORO URBAN RESERVES (Aggregate)	HILLSBORO	Washington	320	0.00	0.00	0.00	14.96	9.24	0.00		4.54	1.36	19.50	10.60	6.09%	3.31%	300.50	309.40			YES	9	8	C	B	B	C	C	B	B		YES	YES				104	Property owners have expressed willingness to aggregate and transact - per City of Hillsboro; On site wetland investigation is warrented - per DSL
109	3		A, D, H	MORSE BROS INC	TUALATIN	Washington	85.31	3.98		0.00	0.00		0.00		21.26		23.59		27.65%		61.73			C	YES	7		C	C	B	C	C	C	B		NO				YES	109	

* These columns indicate that environmental constraint information was provided by jurisdictions, Port of Portland, or Group Mackenzie knowledge and are not from Metro RLIS data. These columns supplement the previous RLIS columns. Net developable acreage (market knowledge) supplements the net developable acreage (RLIS) column.

** Indicates a seller is willing to transact but not within in tier 1 timeframe of 180 days.

TRADED-SECTOR INDUSTRY:

A: Regionally to nationally scaled clean-tech manufacturer
B: Globally scaled clean technology campus
C: Heavy industrial/manufacturing
D: General manufacturing
E: Food processing
F: High-tech manufacturing or campus industrial
G: Regional (multi-state) distribution center
H: Warehouse/distribution
I. Portland regional distribution center
J: Call center/business services
K. Data centers
L: Rural/frontier industrial

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Metro | *Memo*

Date: November 5, 2011

To: MTAC and TPAC members and alternates

From: Nuin-Tara Key, Associate Regional Planner
Kim Ellis, Principal Transportation Planner

Re: Climate Smart Communities Scenarios Phase 1 Preliminary Results – **SUBJECT TO FURTHER ANALYIS AND REFINEMENT**

I. PURPOSE

This memo summarizes background information about the Climate Smart Communities Scenarios Project and presents preliminary results from the Phase 1 scenarios analysis.

II. BACKGROUND

In 2007 the Oregon Legislature established statewide greenhouse gas (GHG) emissions reduction goals. The goals apply to all emission sectors, including energy production, buildings, solid waste and transportation, and - and direct Oregon to:

- Stop increases in GHG emissions by 2010
- Reduce GHG emissions to 10 percent below 1990 levels by 2020
- Reduce GHG emissions to at least 75 percent below 1990 levels by 2050

In 2009, the Legislature passed House Bill 2001, directing Metro to "develop two or more alternative land use and transportation scenarios" by January 2012 that are designed to reduce GHG emissions from light-duty vehicles. The legislation also mandates (1) adoption of a preferred scenario after public review and consultation with local governments; and (2) local government implementation through comprehensive plans and land use regulations that are consistent with the adopted regional scenario.

In 2010, the Legislature approved Senate Bill 1059, providing further direction to GHG scenario planning in the Metro region and the other five metropolitan areas in Oregon. Aimed at reducing GHG emissions from transportation, the legislation mandates several state agencies to work with stakeholders to develop a statewide transportation GHG emission reduction strategy, metropolitan-level GHG emissions reduction targets for cars and light trucks, guidelines for scenario planning, and a toolkit of actions to reduce GHG emissions. While State agencies are looking at the entire transportation sector, Metro—and the other MPOs identified in HB 2001 and SB 1059—are only required to address roadway GHG emissions from light-duty vehicles.

In 2010, Metro's *Making the Greatest Place* initiative resulted in Council adoption of six desired outcomes, the Community Investment Strategy, urban and rural reserves and an updated Regional Transportation Plan. All of these actions provide the policy foundation for better integrating land use

decisions with transportation investments to create prosperous and sustainable communities and meet state climate goals.

STATE RESPONSE – OREGON SUSTAINABLE TRANSPORTATION INITIATIVE[1]

The Oregon Department of Transportation (ODOT) and the Department of Land Conservation and Development (DLCD) are leading the state response through the Oregon Sustainable Transportation Initiative (OSTI). As part of this effort, the Land Conservation and Development Commission adopted per capita roadway GHG emissions reduction targets for light-duty vehicles for all six metropolitan areas within Oregon.

Shown in Table 1, the target for the Portland region calls for a 20 percent GHG emissions reduction below 2005 levels by 2035, in addition to the reductions anticipated from technology and fleet improvements. The LCDC target-setting process assumed fleet and technology would reduce 2005 emissions levels from 4.05 MT CO_2e[2] per capita to 1.51 per capita by 2035.

Table 1. 2035 Roadway GHG emissions reduction target for Oregon metropolitan areas (per capita reduction below 2005 levels)

Metropolitan Area	Adopted Target
Portland Metro**	20%
Eugene-Springfield*	20%
Salem-Keizer	17%
Rogue Valley	19%
Bend	18%
Corvallis	21%

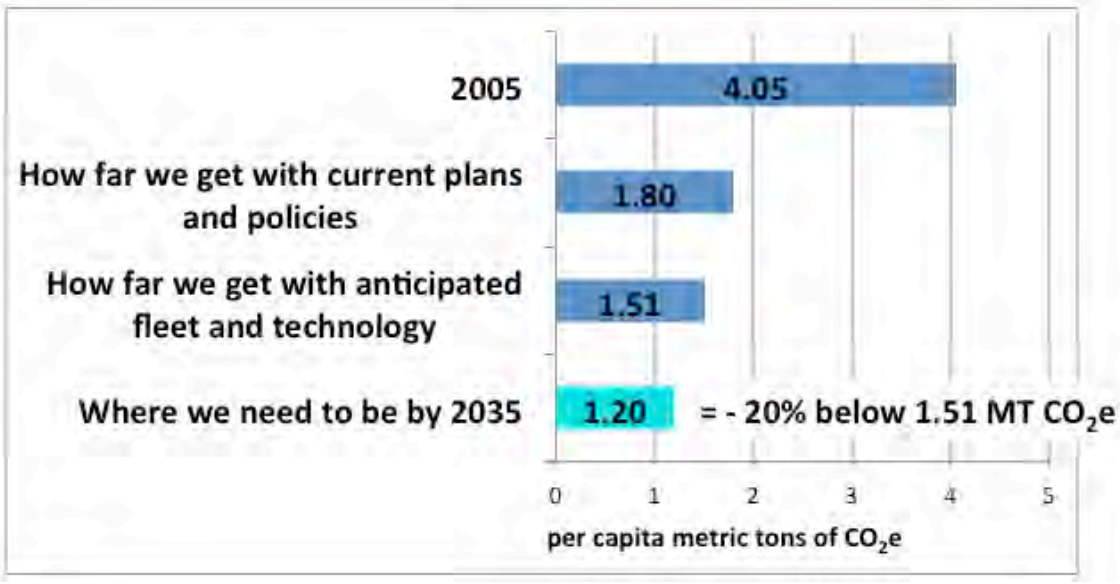
* Scenario planning required.
** Scenario planning and selection of preferred scenario required.

To meet the target the region must reduce roadway emissions to 1.2 MT CO_2e per capita, as shown in Figure 1. While the regional target is based on 2005 values, it has been calibrated to the overall 1990 GHG reduction goal.

[1] For more information, go to http://www.oregon.gov/ODOT/TD/OSTI/

[2] MT CO_2e or Metric Tonne (ton) Carbon Dioxide Equivalent is the standard measurement of greenhouse gas emissions, which include carbon dioxide, methane and nitrous oxide.

Figure 1. Roadway GHG emissions for the Portland metropolitan region (per capita)



REGIONAL RESPONSE – 2040 GROWTH CONCEPT AND CLIMATE SMART COMMUNITIES SCENARIOS

In 1995, the region established a course for growth with the adoption of the 2040 Growth Concept. Metro and its partners have collaborated to help communities realize their local aspirations while moving the region toward its goals: making the region a great place to live, work and play, while balancing growth with sound environmental, social and economic strategies. The Growth Concept provided a guide to actively manage the growth of the region by encouraging development in centers, corridors and employment areas and maintaining a tight urban growth boundary. The efforts of the 2040 Growth Concept provide a good basis for the GHG scenario planning work required of Metro.

Regional and local leaders agree that Oregon and the Portland region must provide leadership in addressing climate change. The Climate Smart Communities Scenarios effort builds on the state-level work conducted to date and the 2010 Council actions with a collaborative regional effort that will advance local aspirations and implementation of the region's 2040 Growth Concept.

There are three phases to the Scenarios' Project as shown in Figure 2. It is recognized that a high degree of community outreach which engages policymakers, local government staff and targeted stakeholders will be required in each phase.

- **Phase 1, Understanding Choices (2011)** consists of testing GHG emission reduction strategies to learn the GHG emissions reduction potential of current plans and policies and what combinations of land use and transportation strategies are needed to meet the state GHG targets. The research and findings from this work will inform subsequent project phases. Metro will seek guidance on the tradeoffs and issues that should be addressed in Phase 2. Outreach activities are focused on key local governments, other public agencies, and business and community leaders to share information and elicit additional information needs during Phase 2 of the project.

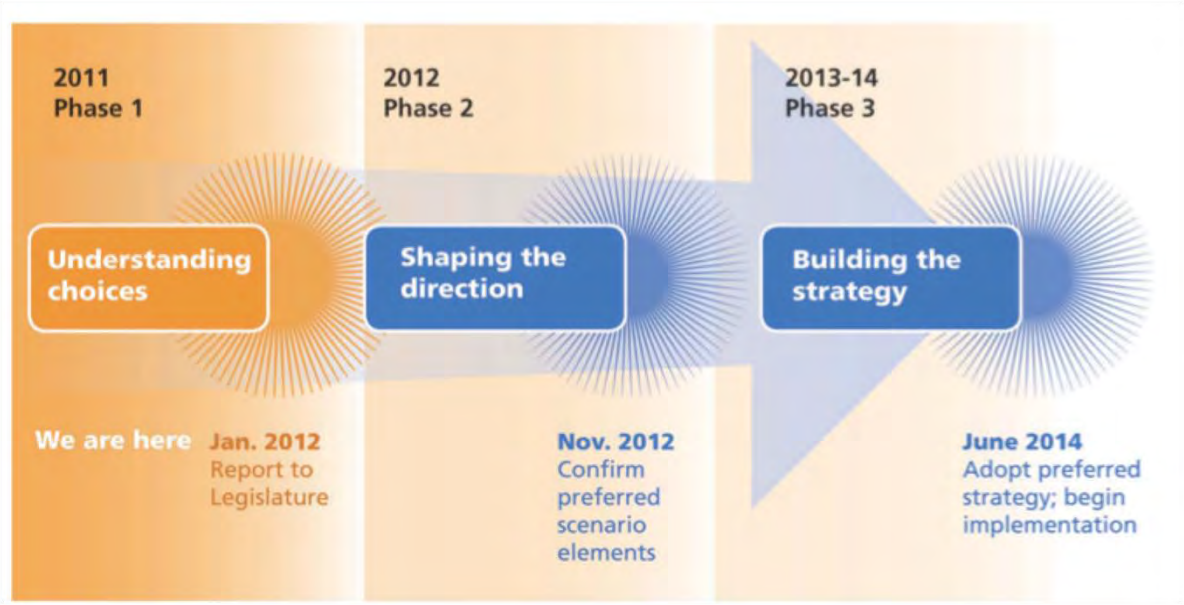
- **Phase 2, Shaping the Direction (2012)** includes developing and evaluating a small number of more tailored theme-based scenarios designed to achieve the state GHG emission reduction target. The scenarios will be informed by the findings from Phase 1 and build on community aspirations, the 2040 Growth Concept and the draft Statewide Transportation Strategy (required in SB 1059, Chapter 85 Oregon Laws, 2010 Session) that is anticipated by summer 2012.

  As the analysis of strategies becomes more refined and geographically specific in 2012, engagement and outreach will broaden to a larger set of stakeholders, including the general public. Design workshops will be used to develop 2 to 4 scenarios. These will be analyzed in more detail, including the opportunities and challenges created by them.

  This information will be important for the discussions about trade-offs, impacts, co-benefits, and feasibility of implementation. The analysis and subsequent stakeholder review will result in a recommended draft "preferred" scenario that will be subject to further analysis and public review in Phase 3. Community outreach will seek input on the integration of land use and transportation strategies at the regional and local levels.

- **Phase 3, Building the Strategy (2013-14)** includes Metro Council consideration of adopting a preferred scenario after public review and consultation with local governments. This phase will define the policies, investments and actions needed to achieve the preferred scenario and result in an updated Regional Transportation Plan and amendments to other regional plans as needed. House Bill 2001 requires local government implementation through comprehensive plans and land use regulations that are consistent with the adopted regional scenario. Community outreach will engage the public more broadly as part of the final public review and adoption process.

Figure 2. Climate Smart Communities Scenarios Timeline



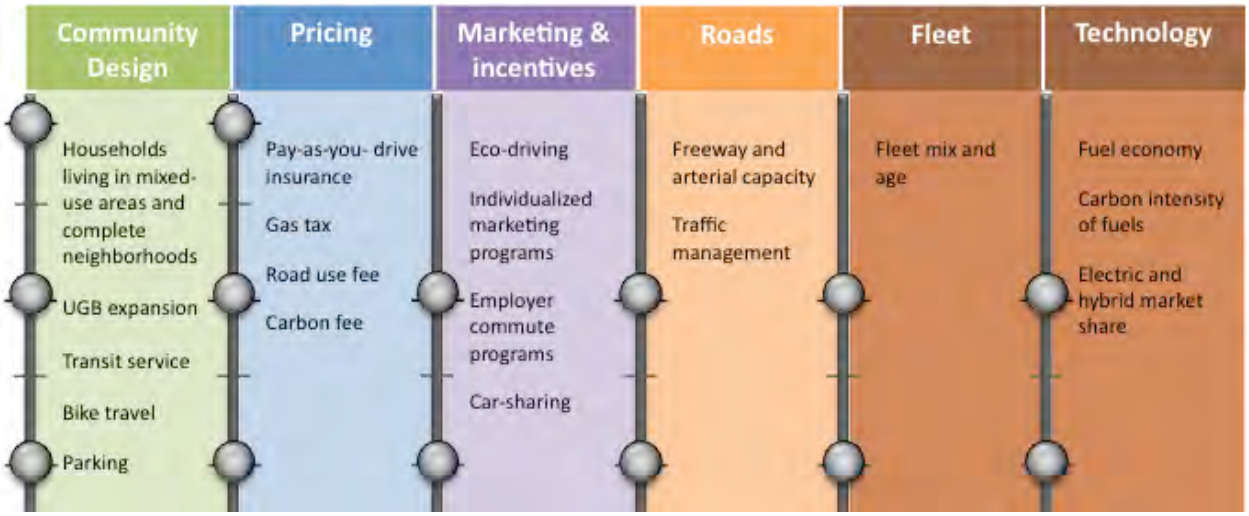
In June 2011, the region discussed and agreed to six guiding principles to undertake this scenario planning effort:

- **Focus on outcomes and co-benefits:** The strategies that are needed to reduce GHG emissions can help save individuals, local governments and the private sector money, grow local businesses and create jobs and build healthy, livable communities. The multiple benefits should be emphasized and central to the evaluation and communication of the results.
- **Build on existing efforts and aspirations:** Start with local plans and 2010 regional actions that include strategies to realize the region's six desired outcomes.
- **Show cause and effect:** Provide sufficient clarity to discern cause and effect relationships between strategies tested and realization of regional outcomes.
- **Be bold, yet plausible and well-grounded:** Explore a range of futures that may be difficult to achieve but are possible in terms of market feasibility, public acceptance and local aspirations.
- **Be fact-based and make information relevant, understandable and tangible:** Develop and organize information so decision-makers and stakeholders can understand the choices, consequences (intended and unintended) and tradeoffs. Use case studies, visualization and illustration tools to communicate results and make the choices real.
- **Meet state climate goals:** Demonstrate what is required to meet state the GHG emission reduction target for cars, small trucks and SUVs, recognizing reductions from other emissions sources must also be addressed in a comprehensive manner.

III. OVERVIEW OF PHASE 1 RESEARCH AND ANALYSIS – UNDERSTANDING CHOICES

Phase 1 of the Climate Smart Communities Scenarios project is focused on understanding the region's choices by testing broad-level, regional scenarios to learn the GHG emissions reduction potential of current plans and policies and what combinations of land use and transportation strategies (grouped in six policy levers) are needed to meet the state GHG targets as shown in Figure 3. While some strategies are new to the region, many of the strategies tested are already being implemented to realize the 2040 Growth Concept and the aspirations of communities across the region.

Figure 3. Policy Levers and Strategies Tested [3]



Background demographic characteristics

The 2035 regional household growth forecast assumed in this analysis comes from the Beta 2050 growth forecast prepared by Metro's Data Resource Center in August 2011. The Beta forecast is an interim forecast that will continue to be reviewed and refined in coordination with local governments in the region prior to being considered for adoption by the Metro Council in 2012. While the regional forecast data will be updated as the project progresses, it is important to note that within each phase of the project regional population will be held constant across the future year alternative scenarios. All Phase 1 and Phase 2 future scenarios will use the same 2035 population forecast and will not adjust the forecast to test alternative population growth assumptions.

Table 2. Metro Beta forecast - Phase 1 2035 population growth assumptions within Metro UGB

2010 Population	2035 Population	Percent change
1.3 million residents	1.8 million residents	38%

These growth rates do not reflect the entire region's projected population growth, but rather the estimated growth within the region's urban growth boundary.

Method and tools

Staff used a regionally tailored version of ODOT's GreenSTEP model to conduct the analysis. Using GreenSTEP—the same model used to set the region's GHG emissions reduction target—ensures compatibility with Oregon's Statewide Transportation Strategy and provides a common GHG emissions reporting tool across the State.

[3] See *Phase 1 Metropolitan GreenSTEP Scenarios Technical Documentation* (November 2011 draft) for more detailed information about the policy levers and strategies tested in this analysis.

In May, a work group of members from the Transportation Policy Advisory Committee (TPAC) and the Metro Technical Advisory Committee (MTAC) was charged with helping Metro staff develop the Phase 1 scenarios assumptions, consistent with the guiding principles and evaluation framework endorsed by the Metro Council, the Joint Policy Advisory Committee on Transportation (JPACT) and the Metro Policy Advisory Committee (MPAC) in June.

The technical work group defined the scenarios to be tested while Metro and ODOT staff continued to develop tools to support the analysis. **Table 3** summarizes the input assumptions used in the Phase 1 scenarios analysis. The model development work concluded in September 2011, and the initial metropolitan Greenhouse Gas State Transportation Emissions Planning (GreenSTEP) model runs were completed in October.

To date, 146 scenarios have been analyzed at a preliminary level. The foundation of this work is the development of a Base Case – the existing conditions for 2010 – and a Reference Case – a forecast of how the region will perform in 2035 based on projected population and demographic trends. The Reference Case assumes the realization of existing plans and policies.

Table 3: 2010 Base Year and Alternative Scenarios Inputs

This table summarizes the inputs for the 2010 Base Year and 144 alternative scenarios that reflect different levels of implementation for each category of policies. The inputs were developed by Metro staff in consultation with a technical work group of MTAC and TPAC members. *This information is for research purposes only and does not necessarily reflect current or future policy decisions of the Metro Council, MPAC or JPACT.*

Policy		Inputs			
		2010 Base Year *Reflects existing conditions*	**2035 Level 1 Reference Case** *Reflects current plans and policies*	**2035 Level 2** *Reflects more ambitious policy changes*	**2035 Level 3** *Reflects even more ambitious policy changes*
Community Design	Households living in mixed-use areas and complete neighborhoods[4] (percent)	GreenSTEP calculates			
	Urban growth boundary expansion (acres)	2010 UGB	7,680 acres	7,680 acres	No expansion
	Bicycle mode share for tours 6 miles or less (percent)	2%	2%	12.5%	30%
	Transit service level	2010 service level	2035 RTP Financially Constrained service level	2.5 times RTP service level	4 times RTP service level
	Workers / non-work trips paying for parking (percent)	13% / 8%	13% / 8%	30% / 30%	30% / 30%
	Average daily parking fee ($2005)	$5.00	$5.00	$5.00	$7.25
Pricing	Pay-as-you-drive insurance (percent of households participating and cost)	0%	0%	100% at $0.06/mile	*No change from L2*
	Gas tax (cost per gallon $2005)	$0.42	$0.48	$0.18	
	Road use fee (cost per mile $2005)	$0	$0	$0.03	
	Carbon emissions fee (cost per ton)	$0	$0	$0	$50

[4] This input was calculated internally by the GreenSTEP model.

Policy		Input			
		2010 Base Year *Reflects existing conditions*	**2035 Level 1 Reference Case** *Reflects current plans and policies*	**2035 Level 2** *Reflects more ambitious policy changes*	**2035 Level 3** *Reflects even more ambitious policy changes*
Marketing & Incentives	Households participating in ecodriving	0%	0%	40%	*No change from L2*
	Households participating in individualized marketing programs (percent)	9%	9%	65%	
	Workers participating in employer-based commuter programs (percent)	20%	20%	40%	
	Car-sharing in high density areas (target participation rate)	Participation rate of 1 member/100 people	Participation rate of 1 member/100	Double participation to 2 members/100	
	Car-sharing in medium density areas (target participation rate)	Participation rate of 1 member/200 people	Participation rate of 1 member/200	Double participation to 2 members/200	
Roads	Freeway and arterial expansion	2010 system	2035 RTP Financially Constrained System	No expansion	*No change from L2*
	Delay reduced by traffic management strategies (percent)	10%	10%	35%	
Fleet	Fleet mix (proportion of autos to light trucks and SUVs)	auto: 57% light truck/SUV: 43%	auto: 56% light truck/SUV: 44%	auto: 71% light truck/SUV: 29%	
	Fleet turnover rate (age)	10 years	10 years	8 years	
Technology	Fuel economy (miles per gallon)	25 mpg	50 mpg	58 mpg	
	Carbon intensity of fuels	90 g CO_2e/ megajoule	81 g CO_2e/ megajoule	72 g CO_2e/ megajoule	
	Light-duty vehicles that are plug-in hybrids or electric vehicles (percent)	auto: 0% light truck/SUV: 0%	auto: 4% light truck/SUV: 1%	auto: 8% light truck/SUV: 2%	

IV. PHASE 1 SCENARIOS RESULTS AND FINDINGS

The Phase 1 testing was conducted at the regional scale. The next section describes the preliminary results from testing 144 combinations of strategies.

The preliminary results indicate that the region's existing plans through 2035, if realized, would result in substantial reductions of GHG emissions from the 2005 levels. The results also show that 93 tested runs meet the difference between these existing plan outcomes and the additional reductions needed to meet the state target. While these preliminary findings are encouraging and offer a variety of ways to meet the state target, many of the inputs that went into the scenario runs would require bold actions on the part of Metro and local governments, as well as actions needed on the part of the state and federal government.

Phase 1 Metropolitan GreenSTEP Preliminary Results Summary

1. Most of the 144 scenarios (65%) evaluated meet or exceed the 20 percent per capita GHG reduction target. The roadway GHG emissions reductions achieved by the 93 scenarios ranged from 20 percent to 53 percent per capita below 2005 levels.
2. Technology and fleet policies alone do not meet the target.
3. The most ambitious pricing (Level 3) does not meet the target.
4. The most ambitious community design (Level 3) provides one scenario alternative that meets the 20% target.
5. Moderate pricing and community design (Level 2) policies together alone do not meet the target without other policies at Level 2.
6. Community design Level 2 results in a greater emissions reduction then pricing level 2, all else being equal.
7. The most ambitious community design (Level 3) provides a large number of scenarios that meet or exceed the target when combined with technology and fleet.
8. Combining both levels of technology and fleet with moderate community design and pricing (level 2) result in multiple scenarios that meet the target.
9. Marketing (Level 2) provides additional scenarios that meet or exceed the target, especially when implemented in combination with community design.

Understanding the relative GHG emissions reduction potential of each policy lever

To better understand the effects of applying each of the policy levers on roadway GHG emissions reductions, two types of analysis were conducted in partnership with State Agency staff. First, the relative effect of each of the bundles of strategies—assumed within each policy lever—was calculated using linear regression to isolate each level as a separate variable. By starting with the 2035 Reference Case (all policy levers set at level 1) the linear regression analysis estimates the incremental effect of "turning up" each policy lever, all else being equal.

The second approach, referred to as a "paired analysis," shows the range of reductions attributable to each bundle of strategies. This analysis isolates each policy lever at each level of implementation, while also considering the interactions between policy levers. In other words, the results of the "paired analysis" are the range of reductions from each policy lever relative to the 2035 Reference Case. For example, if two scenarios are paired to isolate a single policy lever one of the strategies will be set at the Reference Case level (level 1) while the other tests a more ambitious level of implementation. For example, if the following two scenarios are paired up, then the relative difference between scenarios is attributable to going from Community Design level 1 to Community Design level 2.

1. Community Design1/Pricing2/Marketing2/Roads2/Fleet2/Tech2
2. Community Design2/Pricing2/Marketing2/Roads2/Fleet2/Tech2

The result of pairing all 144 scenarios in this way results in the range of reductions attributable to every policy lever at each level of implementation. After identifying the range of reductions attributable to each policy lever, the average reduction in roadway GHG emissions for each policy level was calculated. It should be noted that these analytical approaches do NOT assess the relative effect of changes in individual strategies (e.g. increased per capita transit investment, urban growth boundary expansion), but rather the range of reductions attributable to each set of bundled strategies – also referred to as policy levers.

Figure 3. Paired analysis: estimated percent reduction in roadway GHG emissions, by policy level

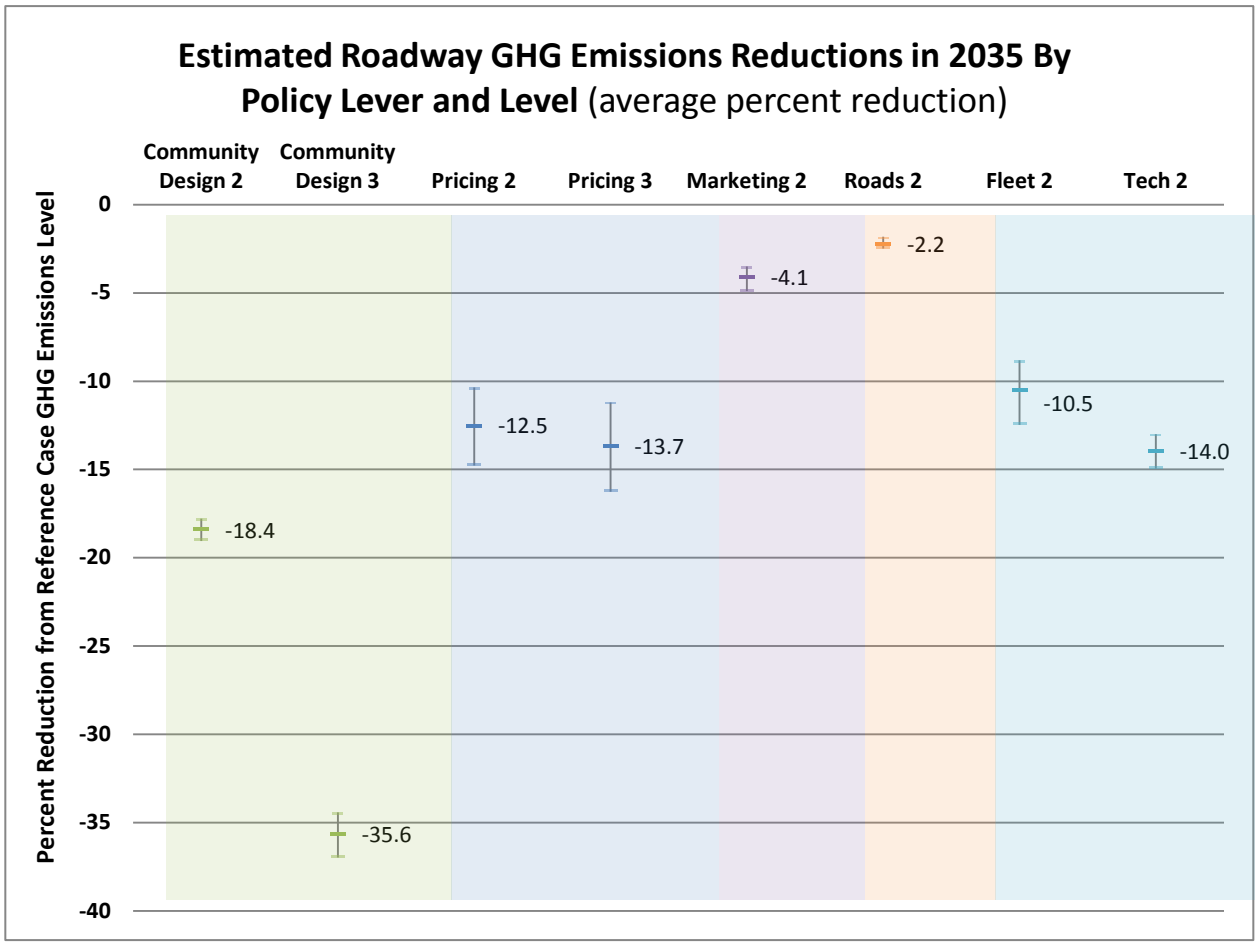


Table 4 provides a comparison of the results of both analytical approaches. It should be noted that results presented below are percent changes (not estimated logarithms) and cannot therefore, be added mathematically to identify the reductions from combining policy levels (e.g. the reductions from Fleet 2 cannot be mathematically added to the reductions from Pricing 2 to calculate the combined effect of these two policy levers).

Table 4. Comparison of analysis results: estimated reduction effects of each policy lever on roadway GHG emissions

Policy Lever and Level	**Estimated percent reduction** (change from 2035 Reference Case)
Community Design Level 2	-18%
Community Design Level 3	-36%
Pricing Level 2	-13%
Pricing Level 3	-14%
Marketing and incentives Level 2	-4%
Roads Level 2	-2%
Fleet Level 2	-11%
Technology Level 2	-14%

The values presented in Table 3 can be interpreted as the average reduction potential of each policy lever relative to the 2035 Reference Case (Level 1). For example, to estimate the impact of going from Community Design 1 to Community Design 2 given the range of all scenarios evaluated, the average reduction in roadway GHG emissions is roughly 18 percent. Given the results above, the bundled Community Design strategies (Levels 2 and 3) achieve the greatest reduction in per capita roadway GHG emissions, followed by Technology Level 2 and then Pricing Level 3.

The following pages highlight the results of selected scenarios to begin to frame potential tradeoffs and choices for policymakers to consider as the Scenarios project transitions into Phase 2. The challenge of determining which strategies should be pursued and how they can be applied to help achieve community aspirations and other desired outcomes will occur in Phase 2.

USER GUIDE: UNDERSTANDING HOW THE RESULTS ARE ORGANIZED

The preliminary analysis includes the following information for each of the analyzed scenarios:

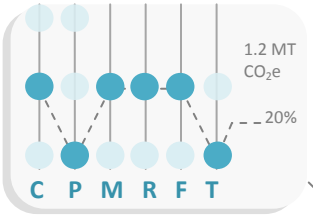
A. Brief narrative explanation of the scenario's assumptions.
B. Conceptual scenario schematic showing each scenario's corresponding levels, by policy lever.
C. Evaluation summary table for each of the evaluation measures.

(A) Brief narrative

State Target alternative scenario (20% reduction in Roadway emissions)

There is one scenario that exactly meets the 20 percent GHG emissions reduction target. This scenario requires more ambitious policies from the reference case for all levels except for pricing and technology. While this scenario exactly meets the GHG emissions reduction target it may not represent the most cost effective approach.

(B) Scenario schematic



Policy Lever Legend

C = Community Design
- Households in mixed-use areas and complete neighborhoods
- Urban growth boundary expansion
- Bicycle mode share
- Transit service
- Parking

P = Pricing
- Pay-as-you-drive insurance
- Gas tax
- Road use fee
- Carbon fee

M = Marketing & incentives
- Employee commute options
- Individualized marketing program
- Car-sharing
- Ecodriving

R = Roads
- Freeway and arterial expansion
- Traffic management delay reduction

F = Fleet
- Fleet mix & turnover rate

T =Technology
- Fuel economy
- Carbon intensity of fuels
- Electric & hybrid vehicle market share

20% reduction target scenario

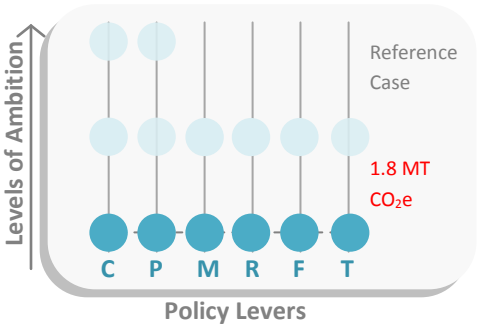
Evaluation measure	2010	2035 Reference Case *c1p1m1r1f1t1*	2035 Alternative Scenario *c2p1m2r2f2t1*	Alternative scenarios that meet or exceed target: range of outputs	
1. Roadway GHG emissions (annual per capita)	3.7 MT Co_2e	1.8 MT Co_2e	1.2 MT CO_2e	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	14.9	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	33%	33%	34%
4. Walk trips (annual per capita)	144	181	189	181	200
5. UGB expansion (acres)	NA	7,680	7,680	7,680	0

(C) Evaluation summary table

Evaluation Measures

1. Roadway GHG emissions per capita
2. Household daily vehicle miles traveled (DVMT) per capita
3. Households in mixed-use areas and complete neighborhoods
4. Walk trips
5. Urban growth boundary expansion

2010 Base and 2035 Reference Case



The foundation of all scenario work is the development of a regional 2010 Base (where we are today) and a forecasted 2035 Reference Case (our current path under existing local and regional plans and policies as adopted to implement the 2040 Growth Concept). The 2010 Base provides a starting point upon which to consider the effects of different land use and transportation strategies. The 2010 Base presents current regional household and employment demographics, transportation infrastructure, and existing land use and development patterns that, when assembled, provide an "existing conditions" snapshot of our region. The 2035 Reference Case provides a forecast of what our region will look like in 2035, given projected population and demographic trends as well as current land use and transportation plans and policies. While the 2035 Reference Case demonstrates a significant reduction in GHG emissions, it does not meet the 2035 reduction target.

The 2035 Reference Case assumes the following adopted policies and plans:

Adopted 2035 Regional Transportation Plan

- Transit service level
- Freeway widening and management
- Arterial connectivity and widening
- 2% regional bike mode share

Locally adopted land use plans

One-quarter of urban reserves developed by 2035

Funding sources at current levels

- Parking fees at 2005 prices and locations
- State and federal gas tax (48 cents/gallon)

9 percent of households participate in individualized marketing

20 percent of workforce participates in employer-based commute programs

Current fleet mix trend

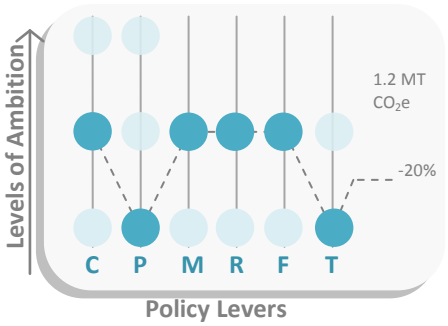
Achieve federal CAFÉ standard of 50 MPG

Electric vehicle share grows to 4 percent

Base and reference case scenarios

Evaluation measure	2010	2035 Reference Case *c1p1m1r1f1t1*	Alternative scenarios that meet or exceed target: range of outputs	
1. Roadway GHG emissions (annual per capita)	3.7 MT CO_2e	1.8 MT Co_2e	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	33%	34%
4. Walk trips (annual per capita)	144	181	181	200
5. UGB expansion (acres)	NA	7,680	7,680	0

State Target alternative scenario (20% reduction in roadway emissions)



This scenario assumes more ambitious policies from the 2035 Reference Case for all policy levers Except for pricing and technology and meets the 20 percent reduction target. This scenario demonstrates the effects of:

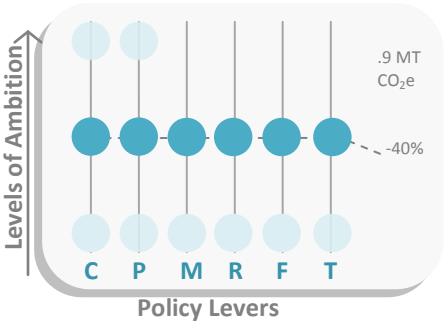
- a regional bike mode share of 12.5 percent for all tours 6 miles in length or shorter (3 miles one-way);
- an increase in transit revenue mile service levels by almost 2.5 times the level assumed in the 2035 RTP;
- a 7,680 acre expansion of the UGB , representing one-quarter of the urban reserves designated by the Metro Council;
- 13% of area workers and 8% of non-work trips pay for parking. The average daily long-term rate for parking stays the same at $5 per day in 2005 dollars.

This scenario assumes no increase in fuel taxes beyond today's level. Marketing changes include a large expansion of marketing and incentives programs where 65% of households participate in individualized marketing program and 40% of workers work for employers with strong employee commute options programs, 40% of households use eco-driving practices to conserve fuel consumption; and twice as households participate in car-sharing programs as they do today. The road assumptions reflect a no-expansion policy and instead increase the reliance on traffic management to address 35 percent of the region's delay. The fleet assumptions reflect a change in current fleet mix trends (i.e. a growth in light autos relative to light trucks) and an increased fleet turnover rate. Fleet level 2 represents the anticipated improvements assumed by the state when setting the region's GHG emissions reduction target. This scenario assumes current technology policies remain in place – achieving a fleet average economy of 50 MPG by 2035, the low carbon fuel standard is in effect (carbon content of fuel is 10% below today's values) and electric vehicles represent 4% of auto market and 1% of the light truck market.

20% reduction target scenario

Evaluation measure	**2010**	**2035 Reference Case** *c1p1m1r1f1t1*	**2035 Alternative Scenario** *c2p1m2r2f2t1*	**Alternative scenarios that meet or exceed target: range of outputs**	
1. Roadway GHG emissions (annual per capita)	**3.7 MT Co_2e**	**1.8 MT Co_2e**	**1.2 MT CO_2e**	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	14.9	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	33%	33%	34%
4. Walk trips (annual per capita)	144	181	189	181	200
5. UGB expansion (acres)	NA	7,680	7,680	7,680	0

Medium value alternative scenario (40% reduction in roadway emissions)



If all policy levers are implemented at level 2, the region achieves a 40% reduction in roadway GHG emissions in 2035. In addition to meeting the investment and policy decisions required to implement the 2035 Reference Case (existing plans and policies), this scenario demonstrates the effects of:

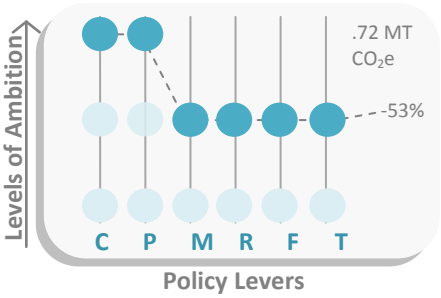
- a regional bike mode share of 12.5 percent for all tours 6 miles in length or shorter (3 miles one-way);
- an increase in transit revenue mile service levels by almost 2.5 times the level assumed in the 2035 RTP;
- a 7,680 acre expansion of the UGB , representing 1/4 quarter of the urban reserves designated by the Metro Council in 2010 and 2011.
- expanding the locations of paid parking from today so that 30% of area workers and 30% of non-work trips pay for parking. The average daily long-term rate for parking stays the same at $5 per day in 2005 dollars.

Pricing Level 2 assumes a transfer of the 2035 RTP assumed state gas tax (including an increase of 1 cent per year) to a mileage-based road use fee of $ 0.03 per mile and implementation of pay-as-you-drive insurance for all insured drivers at $ 0.06 per mile. Marketing changes include a large expansion of marketing and incentives programs where 65% of households participate in individualized marketing program and 40% of workers work for employers with strong employee commute options programs, 40% of households use eco-driving practices to conserve fuel consumption; and twice as households participate in car-sharing programs as they do today. The road assumptions reflect a no-expansion policy and instead rely on traffic management to address 35 percent of the region's delay. The technology and fleet assumptions reflect the anticipated improvements assumed by the state when setting the region's GHG emissions reduction target.

Medium value alternative scenario: 40% reduction

Evaluation measure	**2010**	**2035 Reference Case** *c1p1m1r1f1t1*	**2035 Alternative Scenario** *c2p2m2r2f2t2*	**Alternative scenarios that meet or exceed target: range of outputs**	
1. Roadway GHG emissions (annual MT per capita)	**3.7 MT CO_2e**	**1.8 MT Co_2e**	**.9 MT CO_2e**	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	13.3	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	33%	33%	34%
4. Walk trips (annual per capita)	144	181	189	181	200
5. UGB expansion (acres)	NA	7,680	7,680	7,680	0

Maximum reduction scenario (53% reduction in roadway GHG emissions)



One scenario achieved a 53 percent per capita roadway GHG emissions reduction. This scenario demonstrates the effects of the following community design strategies:

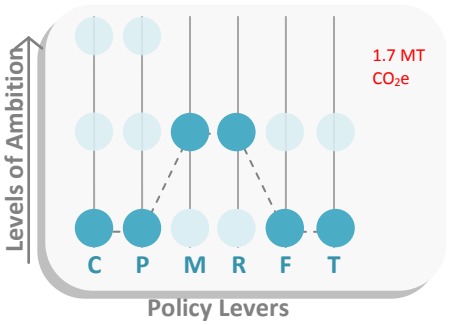
- a regional bike mode share of 30% percent for all tours 6 miles in length or shorter (3 miles one-way);
- an increase in transit revenue mile service levels by almost 4 times the level assumed in the 2035 RTP;
- a 7,680 acre expansion of the UGB , representing one-quarter of the urban reserves designated by the Metro Council;
- expanding the locations of paid parking from today so that 30% of area workers and 30% of non-work trips pay for parking. The average daily long-term rate for parking increases to $7.25 per day in 2005 dollars.

Pricing level 3 assumes a transfer of the 2035 RTP assumed state gas tax (including an increase of 1 cent per year) to a mileage-based road use fee of $ 0.03 per mile, implementation of pay-as-you-drive insurance for all insured drivers at $ 0.06 per mile and deployment of a carbon emissions fee at $50 per ton, which is the equivalent of $ 0.01 per mile. Marketing changes include a large expansion of marketing and incentives programs where 65% of households participate in individualized marketing program and 40% of workers work for employers with strong employee commute options programs, 40% of households use eco-driving practices to conserve fuel consumption; and twice as households participate in car-sharing programs as they do today. The road assumptions reflect a no-expansion policy and instead rely on traffic management to address 35 percent of the region's delay. The technology and fleet assumptions reflect the anticipated improvements assumed by the state when setting the region's GHG emissions reduction target.

Maximum reductions scenario: 53% reduction

Evaluation measure	**2010**	**2035 Reference Case** *c1p1m1r1f1t1*	**2035 Alternative Scenario** *c3p3m2r2f2t2*	**Alternative scenarios that meet or exceed target: range of outputs**	
1. Roadway GHG emissions (annual per capita)	**3.7 MT CO_2e**	**1.8 MT Co_2e**	**.71 MT Co_2e**	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	10.6	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	34%	33%	34%
4. Walk trips (annual per capita)	144	181	199	181	200
5. UGB expansion (acres)	NA	7,680	0	7,680	0

Evaluating marketing and roads



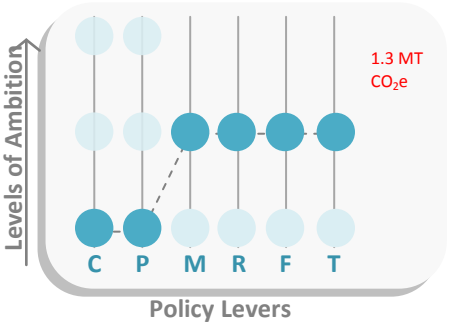
The following scenario demonstrates the effect of testing marketing and roads at level 2 while keeping all other policies levers at level 1 (current plans and policies). This combination of policy strategies does not meet the region's GHG reduction target.

This scenario tests the effect of a large expansion of marketing and incentives programs where 65% of households participate in individualized marketing program and 40% of workers work for employers with strong employee commute options programs, 40% of households use eco-driving practices to conserve fuel consumption; and twice as households participate in car-sharing programs as they do today. The road assumptions reflect a no-expansion policy and instead rely on traffic management to address 35 percent of the region's delay. The auto and light truck proportions of the light vehicle fleet are the same as today and fleet turnover rate is the same as today – 10 years. Technology level 1 represents a significant improvement in fuel efficiency for automobiles built by 2035 – achieving a fleet average of 50 MPG, the low carbon fuel standard is in effect (carbon content of fuel is 10% below today's values) and electric vehicles represent 4% of auto market and 1% of the light truck market.

Evaluating marketing and roads

Evaluation measure	**2010**	**2035 Reference Case** *c1p1m1r1f1t1*	**2035 Alternative Scenario** *c1p1m2r2f1t1*	**Alternative scenarios that meet or exceed target: range of outputs**	
1. Roadway GHG emissions (annual per capita)	**3.7 MT CO_2e**	**1.8 MT Co_2e**	**1.7 MT CO_2e**	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	17.8	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	33%	33%	34%
4. Walk trips (annual per capita)	144	181	181	181	200
5. UGB expansion (acres)	NA	7,680	7,680	7,680	0

Evaluating marketing, roads, fleet and technology



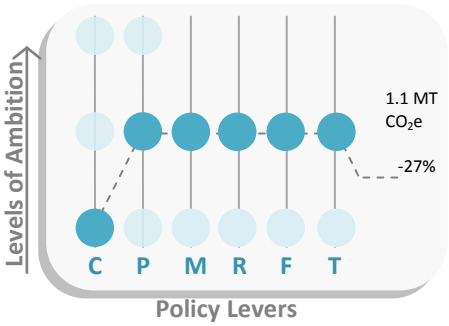
The following scenario demonstrates the effect of testing all policy levers at level 2 except community design and pricing. While this combination of strategies results in significant roadway GHG emissions, it does not meet the region's GHG reduction target.

Marketing changes include a large expansion of marketing and incentives programs where 65% of households participate in individualized marketing program and 40% of workers work for employers with strong employee commute options programs, 40% of households use eco-driving practices to conserve fuel consumption; and twice as households participate in car-sharing programs as they do today. The road assumptions reflect a no-expansion policy and instead rely on traffic management to address 35 percent of the region's delay. The technology and fleet assumptions reflect the anticipated improvements assumed by the state when setting the region's GHG emissions reduction target.

Evaluating marketing, roads, fleet and technology

Evaluation measure	2010	2035 Reference Case *c1p1m1r1f1t1*	2035 Alternative Scenario *c1p1m2r2f2t2*	Alternative scenarios that meet or exceed target: range of outputs	
1. Roadway GHG emissions (annual per capita)	**3.7 MT CO_2e**	**1.8 MT Co_2e**	**1.3 MT CO_2e**	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	18	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	33%	33%	34%
4. Walk trips (annual per capita)	144	181	181	181	200
5. UGB expansion (acres)	NA	7,680	7,680	7,680	0

More ambitious pricing, and most ambitious marketing, roads, fleet and technology



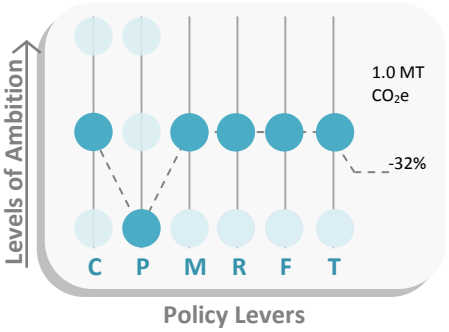
The following scenario builds off of the previous two scenario alternatives and demonstrates the effect of testing all policy levers at level 2 except community design. By adding pricing level 2 this combination of policy alternatives exceeds the region's GHG reduction target, resulting in an annual per capita emissions rate of 1.1 MT CO_2e, which is the equivalent of a 27 percent reduction below 2005 levels.

Pricing Level 2 assumes a transfer of the 2035 RTP assumed state gas tax (including an increase of 1 cent per year) to a mileage-based road use fee of $ 0.03 per mile and implementation of pay-as-you-drive insurance for all insured drivers at $ 0.06 per mile. Marketing changes include a large expansion of marketing and incentives programs where 65% of households participate in individualized marketing program and 40% of workers work for employers with strong employee commute options programs, 40% of households use eco-driving practices to conserve fuel consumption; and twice as households participate in car-sharing programs as they do today. The road assumptions reflect a no-expansion policy and instead rely on traffic management to address 35 percent of the region's delay. The technology and fleet assumptions reflect the anticipated improvements assumed by the state when setting the region's GHG emissions reduction target.

Ambitious pricing, marketing, roads, fleet and technology: 27% reduction

Evaluation measure	**2010**	**2035 Reference Case** *c1p1m1r1f1t1*	**2035 Alternative Scenario** *c1p2m2r2f2t2*	**Alternative scenarios that meet or exceed target: range of outputs**	
1. Roadway GHG emissions (annual per capita)	**3.7 MT CO_2e**	**1.8 MT Co_2e**	**1.1 MT CO_2e**	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	16.1	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	33%	33%	34%
4. Walk trips (annual per capita)	144	181	181	181	200
5. UGB expansion (acres)	NA	7,680	7,680	7,680	0

Ambitious community design, marketing, roads, fleet and technology



This scenario builds from the previous three to demonstrate the effect of testing all policy levers at level 2 except pricing. By increasing community design to level 2 and keeping pricing at level 1 this combination of policy levers exceeds the region's GHG reduction target. While this and the previous scenario both exceed the region's reduction target, community design level 2 results in a greater reduction then pricing level 2, all else being equal.

Community design level 2 demonstrates the effects of this scenario demonstrates the effects of:

- a regional bike mode share of 12.5 percent for all tours 6 miles in length or shorter (3 miles one-way);
- an increase in transit revenue mile service levels by almost 2.5 times the 2035 RTP;
- a 7,680 acre expansion of the UGB , representing 1/4 quarter of the urban reserves designated by the Metro Council.
- expanding the locations of paid parking from today so that 30% of area workers and 30% of non-work trips pay for parking. The average daily long-term rate for parking stays the same at $5 per day in 2005 dollars.

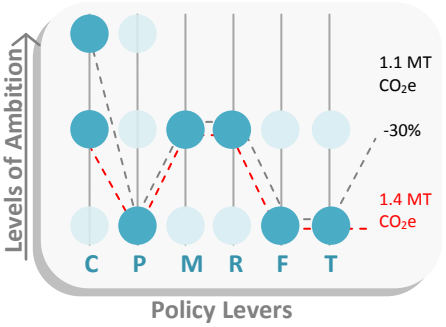
Pricing level 1 assumes existing state and federal gas tax levels. Marketing changes include a large expansion of marketing and incentives programs where 65% of households participate in individualized marketing program and 40% of workers work for employers with strong employee commute options programs, 40% of households use eco-driving practices to conserve fuel consumption; and twice as households participate in car-sharing programs as they do today. The road assumptions reflect a no-expansion policy and instead rely on traffic management to address 35 percent of the region's delay. The technology and fleet assumptions reflect the anticipated improvements assumed by the state when setting the region's GHG emissions reduction target.

Evaluating ambitious community design, marketing, roads, fleet and technology: 32% reduction

Evaluation measure	**2010**	**2035 Reference Case** *c1p1m1r1f1t1*	**2035 Alternative Scenario** *c2p1m2r2f2t2*	**Alternative scenarios that meet or exceed target: range of outputs**	
1. Roadway GHG emissions (annual per capita)	**3.7 MT CO_2e**	**1.8 MT Co_2e**	**1.0 MT CO_2e**	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	14.9	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	33%	33%	34%
4. Walk trips (annual per capita)	144	181	189	181	200
5. UGB expansion (acres)	NA	7,680	7,680	7,680	0

Evaluating the influence of community design

The following two scenarios demonstrate the influence of increasing community design from level 2 to level 3, within the context of maintaining current technology and fleet assumptions and ambitious marketing and road policies. The result indicates that without achieving the State's assumed fleet and technology improvements, it is not possible to meet the regional GHG emissions reduction target without achieving community design level 3, even with the most ambitious marketing and road policies. Implementing community design level 3 results in a thirty percent reduction.



Community design level 2 demonstrates the effects of this scenario demonstrates the effects of:

- a regional bike mode share of 12.5 percent for all tours 6 miles in length or shorter (3 miles one-way);
- an increase in transit revenue mile service levels by almost 2.5 times the level assumed in the 2035 RTP;
- a 7,680 acre expansion of the UGB , representing 1/4 quarter of the urban reserves designated by the Metro Council.
- expanding the locations of paid parking from today so that 30% of area workers and 30% of non-work trips pay for parking. The average daily long-term rate for parking stays the same at $5 per day in 2005 dollars.

Increasing to community design level 3 demonstrates the effects of:

- a regional bike mode share of 30 percent for all tours 6 miles in length or shorter (3 miles one-way);
- an increase in transit revenue mile service levels by 4 times the level assumed in the 2035 RTP;
- no expansion of the UGB
- expanding the locations of paid parking from today so that 30% of area workers and 30% of non-work trips pay for parking. The average daily long-term rate for parking increases to $7.25 per day in 2005 dollars.

Pricing level 1 assumes existing state and federal gas tax levels. Marketing changes include a large expansion of marketing and incentives programs where 65% of households participate in individualized marketing program and 40% of workers work for employers with strong employee commute options programs, 40% of households use eco-driving practices to conserve fuel consumption; and twice as households participate in car-sharing programs as they do today. The road assumptions reflect a no-expansion policy and instead rely on traffic management to address 35 percent of the region's delay.

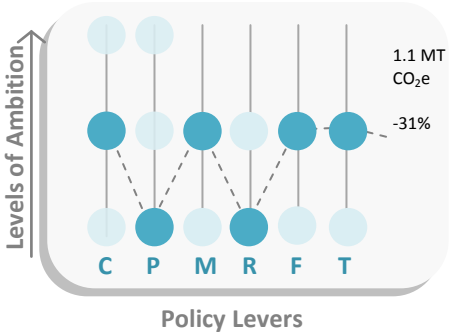
The auto and light truck proportions of the light vehicle fleet are the same as today and fleet turnover rate is the same as today – 10 years. Technology level 1 represents a significant improvement in fuel efficiency for automobiles built by 2035 – achieving a fleet average of 50 MPG, the low carbon fuel standard is in effect (carbon content of fuel is 10% below today's values) and electric vehicles represent 4% of auto market and 1% of the light truck market.

Evaluating the influence of community design

Evaluation measure	**2010**	**2035 Reference Case** *c1p1m1r1f1t1*	**2035 Alternative Scenario** *c2p1m2r2f1t1*	**2035 Alternative Scenario** *c3p1m2r2f1t1*	**Scenarios that meet or exceed target: range of outputs**	
1. Roadway GHG emissions (annual per capita)	**3.7 MT CO_2e**	**1.8 MT Co_2e**	**1.4 MT CO_2e**	**1.1 MT CO_2e**	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	14.7	11.6	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	33%	34%	33%	34%
4. Walk trips (annual per capita)	144	181	189	199	181	200
5. UGB expansion (acres)	NA	7,680	7,680	0	7,680	0

Evaluating community design, marketing, fleet and technology

Building off the previous two scenarios, this scenario tests the outcomes of applying the State's assumed fleet and technology improvements and keeping community design and marketing at level 2. Unlike the previous scenario with community design at level 2, this scenario exceeds the target, resulting in a reduction of thirty-one percent. This scenario also maintains the planned 2035 RTP road system and assumes 10 percent of the region's delay will be addressed through traffic management.



Community design level 2 demonstrates the effects of this scenario demonstrates the effects of:

- a regional bike mode share of 12.5 percent for all tours 6 miles in length or shorter (3 miles one-way);
- an increase in transit revenue mile service levels by almost 2.5 times the level assumed in the 2035 RTP;
- a 7,680 acre expansion of the UGB , representing 1/4 quarter of the urban reserves designated by the Metro Council.
- expanding the locations of paid parking from today so that 30% of area workers and 30% of non-work trips pay for parking. The average daily long-term rate for parking stays the same at $5 per day in 2005 dollars.

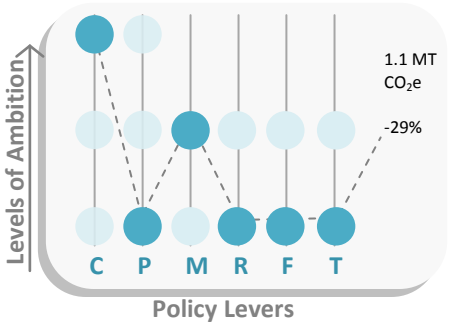
Pricing level 1 assumes existing state and federal gas tax levels. Marketing changes include a large expansion of marketing and incentives programs where 65% of households participate in individualized marketing program and 40% of workers work for employers with strong employee commute options programs, 40% of households use eco-driving practices to conserve fuel consumption; and twice as households participate in car-sharing programs as they do today. The road assumptions reflect a no-expansion policy and instead rely on traffic management to address 35 percent of the region's delay.

Road level 1 assumptions reflect the existing 2035 RTP road network and rely on traffic management to address 10 percent of the region's delay. The technology and fleet assumptions reflect the anticipated improvements assumed by the state when setting the region's GHG emissions reduction target.

Evaluating community design, marketing, fleet and technology: 31% reduction

Evaluation measure	2010	2035 Reference Case *c1p1m1r1f1t1*	2035 Alternative Scenario *c2p1m2r1f2t2*	Alternative scenarios that meet or exceed target: range of outputs	
1. Roadway GHG emissions (annual per capita)	**3.7 MT CO_2e**	**1.8 MT Co_2e**	**1.1 MT CO_2e**	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	14.9	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	33%	33%	34%
4. Walk trips (annual per capita)	144	181	189	181	200
5. UGB expansion (acres)	NA	7,680	0	7,680	0

Evaluating the most ambitious community design and marketing levers



Applying community design level 3 and marketing level 2 (the most ambitious level for each policy lever) results in a scenario that exceeds the regional GHG emissions reduction target, while maintaining the planned 2035 RTP road system. Increasing to community design level 3 demonstrates the effects of:

- a regional bike mode share of 30 percent for all tours 6 miles in length or shorter (3 miles one-way);
- an increase in transit revenue mile service levels by 4 times the level assumed in the 2035 RTP;
- no expansion of the UGB;
- expanding the locations of paid parking from today so that 30% of area workers and 30% of non-work trips pay for parking. The average daily long-term rate for parking increases to $7.25 per day in 2005 dollars.

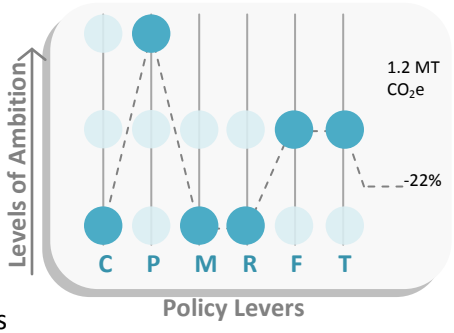
Pricing level 1 assumes existing state and federal gas tax levels. Marketing changes include a large expansion of marketing and incentives programs where 65% of households participate in individualized marketing program and 40% of workers work for employers with strong employee commute options programs, 40% of households use eco-driving practices to conserve fuel consumption; and twice as households participate in car-sharing programs as they do today.

Road assumptions reflect the existing 2035 RTP road network, and rely on traffic management to address 10 percent of the region's delay. The auto and light truck proportions of the light vehicle fleet are the same as today and fleet turnover rate is the same as today – 10 years. Technology level 1 represents a significant improvement in fuel efficiency for automobiles built by 2035 – achieving a fleet average of 50 MPG, the low carbon fuel standard is in effect (carbon content of fuel is 10% below today's values) and electric vehicles represent 4% of auto market and 1% of the light truck market.

Evaluating the most ambitious community design and marketing: 29% reduction

Evaluation measure	2010	2035 Reference Case *c1p1m1r1f1t1*	2035 Alternative Scenario *c3p1m2r1f1t1*	Alternative scenarios that meet or exceed target: range of outputs	
1. Roadway GHG emissions (annual per capita)	**3.7 MT CO_2e**	**1.8 MT Co_2e**	**1.1 MT CO_2e**	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	11.6	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	34%	33%	34%
4. Walk trips (annual per capita)	144	181	200	181	200
5. UGB expansion (acres)	NA	7,680	0	7,680	0

Evaluating the most ambitious pricing, fleet and technology levers



Applying the most ambitious pricing, fleet and technology levers results in a reduction that slightly exceeds the regional GHG target. This scenario demonstrates that pricing level 3, in combination with the State's assumed fleet and technology assumptions, meet the target within the context of existing land use and transportation plans.

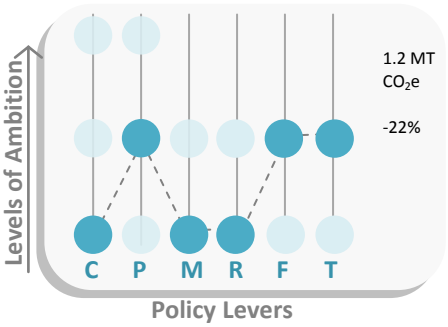
Pricing level 3 assumes a transfer of the 2035 RTP assumed state gas tax (including an increase of 1 cent per year) to a mileage-based road use fee of $ 0.03 per mile, implementation of pay-as-you-drive insurance for all insured drivers at $ 0.06 per mile and deployment of a carbon emissions fee at $50 per ton, which is the equivalent of $ 0.01 per mile. Marketing and incentives programs remain in place as they are today where 9% of households participate in individualized marketing program and 20% of workers work for employers with strong employee commute options programs, zero households use eco-driving practices to conserve fuel consumption; and car-sharing programs as they do today.

Road assumptions reflect the existing 2035 RTP road network, and rely on traffic management to address 10 percent of the region's delay. The technology and fleet assumptions reflect the anticipated improvements assumed by the state when setting the region's GHG emissions reduction target.

Evaluating the most ambitious pricing, fleet and technology levers: 22% reduction

Evaluation measure	2010	2035 Reference Case *c1p1m1r1f1t1*	2035 Alternative Scenario *c1p3m1r1f2t2*	Alternative scenarios that meet or exceed target: range of outputs	
1. Roadway GHG emissions (annual per capita)	**3.73 MT CO_2e**	**1.8 MT Co_2e**	**1.2 MT CO_2e**	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	16.2	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	33%	33%	34%
4. Walk trips (annual per capita)	144	181	181	181	200
5. UGB expansion (acres)	NA	7,680	7,680	7,680	0

Evaluating ambitious pricing, fleet and technology



Building off the previous scenario, apply pricing level 2 in combination with the State's assumed fleet and technology assumptions also exceeds the region's reduction target. Comparing these two scenarios highlights the relatively small difference (with respect to reducing roadway GHG emissions) between pricing levels 2 and 3.

Pricing Level 2 assumes a transfer of the 2035 RTP assumed state gas tax (including an increase of 1 cent per year) to a mileage-based road use fee of $ 0.03 per mile and implementation of pay-as-you-drive insurance for all insured drivers at $ 0.06 per mile. Marketing and incentives programs remain in place as they are today where 9% of households participate in individualized marketing program and 20% of workers work for employers with strong employee commute options programs, zero households use eco-driving practices to conserve fuel consumption; and car-sharing programs as they do today.

Road assumptions reflect the existing 2035 RTP road network, and rely on traffic management to address 10 percent of the region's delay. The technology and fleet assumptions reflect the anticipated improvements assumed by the state when setting the region's GHG emissions reduction target.

Evaluating ambitious pricing, fleet and technology levers: 22% reduction

Evaluation measure	2010	2035 Reference Case *c1p1m1r1f1t1*	2035 Alternative Scenario *c1p2m1r1f2t2*	Alternative scenarios that meet or exceed target: range of outputs	
1. Roadway GHG emissions (annual per capita)	**3.73 MT CO_2e**	**1.8 MT Co_2e**	**1.2 MT CO_2e**	1.2	.71
2. Household Light Vehicle DVMT (per capita)	18.9	18.1	16.4	16.4	10.2
3. Households living within mixed-use areas and complete neighborhoods (percent)	24%	33%	34%	33%	34%
4. Walk trips (annual per capita)	144	181	199	181	200
5. UGB expansion (acres)	NA	7,680	7,680	7,680	0

The outputs below are not linked – they result from different combinations. They are assembled in a single table to demonstrate the range of values for each evaluation measure output.

Alternative future scenarios: range of outputs for scenarios that meet or exceed target

Evaluation Measures	Alternative scenarios that meet or exceed the target: range of outputs		Percent Change
1. Roadway GHG emissions (annual per capita)	1.2 MT CO_2e *(20% reduction below 2005 levels)*	.71 MT CO_2e *(53% reduction below 2005 levels)*	-42%
2. Household Light Vehicle DVMT (per capita)	16.4	10.2	-38%
3. Households living within mixed-use areas and complete neighborhoods (percent)	33%	34%	4%
4. Walk trips (annual per capita)	181	200	10%
5. UGB expansion (acres)[5]	7,680	0	3%

[5] The 2010 UGB contains 220,800 acres.

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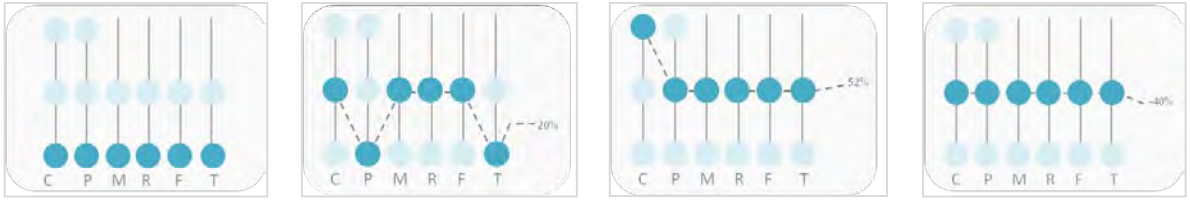
Climate Smart Communities: Scenarios Project

Phase 1 Metropolitan GreenSTEP Scenarios Technical Documentation

This information is for research purposes only and does not necessarily reflect current or future policy decisions of the Metro Council, MPAC or JPACT.

October 2011 - **DRAFT**



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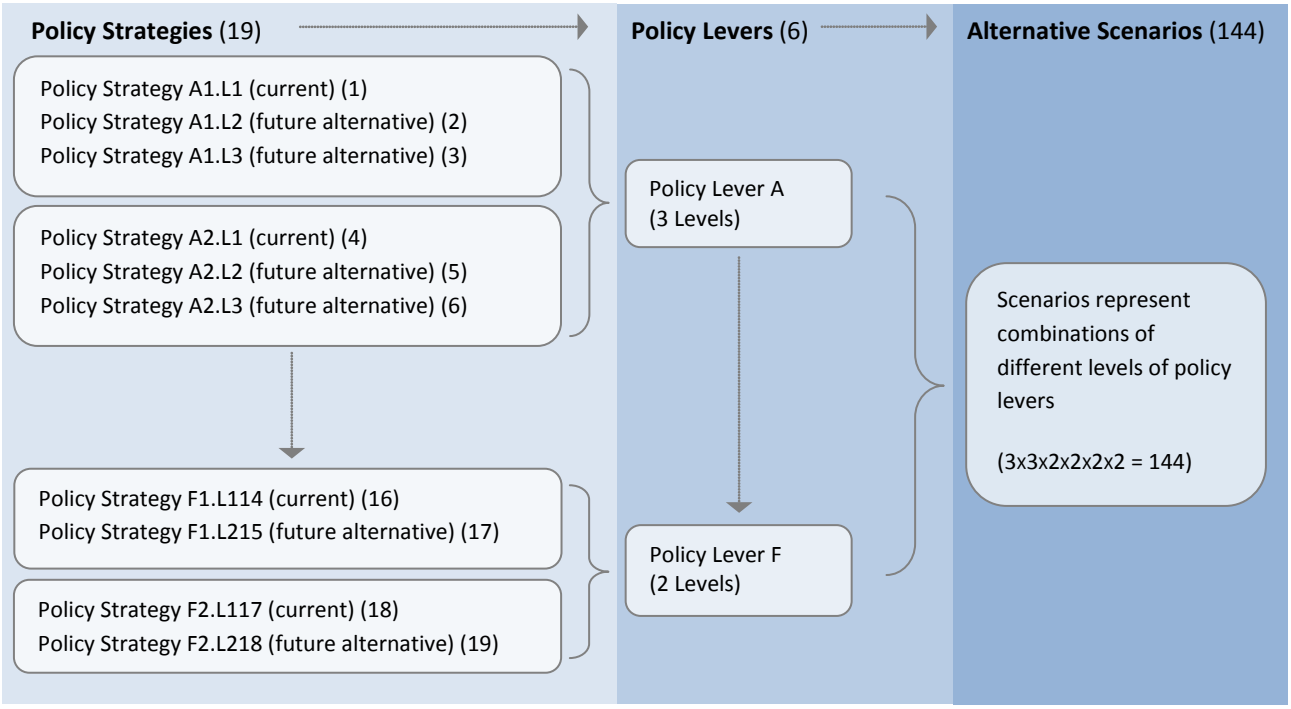
Purpose and Legislative Background

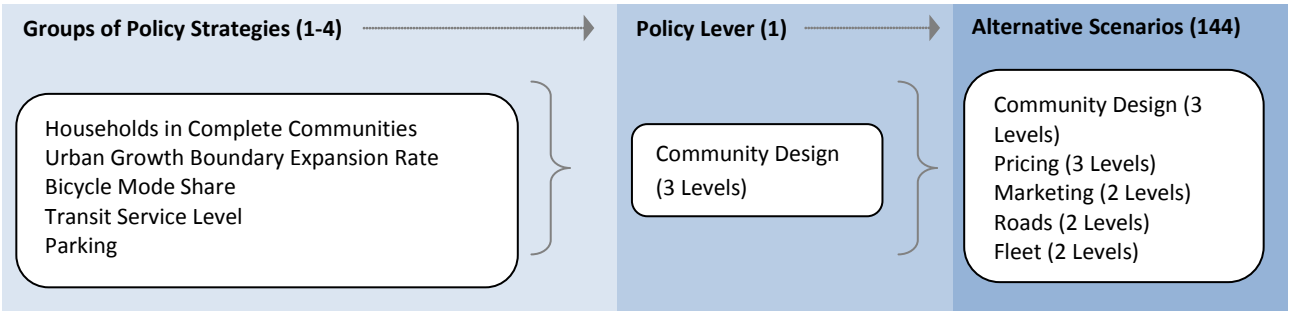
This document provides a detailed description of the rationale behind all Phase 1 Metropolitan GreenSTEP policy inputs. The inputs were developed by Metro staff in consultation with a work group of members of the Metro Technical Advisory Committee (MTAC) and the Transportation Policy Alternatives Committee (TPAC).

The purpose of the analysis is to test the Greenhouse Gas (GHG) emissions reduction potential of current plans and policies, including different combinations of land use and transportation strategies. Metropolitan GreenSTEP, a transportation GHG emissions model developed by the Oregon Department of Transportation (ODOT), provides the opportunity to evaluate a variety of strategies (grouped as six *policy levers*), many of which are already being implemented in an effort to realize the 2040 Growth Concept and the aspirations of communities throughout the region.

Figure 1: Conceptual Metropolitan GreenSTEP Model Framework



Example: Community Design Strategies and Policy Lever



The input data for each of the six GreenSTEP model policy levers are documented and include: (1) a brief description of the policy input tested; (2) input values assumed for each policy lever; (3) supplemental research where applicable; and (4) other background assumptions used in the analysis.

The inputs for each of the strategies are used to create 144 scenarios. The scenarios range from a 2035 Reference Case that reflects current plans and policies to alternative future scenarios that reflect combinations of different levels of implementation for each policy for strategy.

Under the Reference Case, relevant policies and factors continue into the future, more or less at current levels, trends or anticipated changes. The Reference Case will be used to understand the GHG emissions reductions potential of existing plans and policies, and serve as the basis for comparison with the alternative scenarios that assume more aggressive implementation of the range of strategies. Technical inputs were localized using regional data, where possible. Policy inputs for future fuel economy and carbon content, fleet mix and turnover rates and electric vehicle deployment rates were defined in the State Agency Technical Report (March 1, 2011) and assumed for purposes of this analysis to be consistent with the Metropolitan Greenhouse Gas Emissions Reduction Targets.

The results of the analysis will be used to frame policy choices and tradeoffs presented by the most effective strategies and to begin identifying implementation opportunities and challenges associated with different approaches to meeting the GHG emissions reduction target. The findings from this regional-level scenarios analysis and the Strategy Toolbox report (September 2011) will be used to recommend policy options and packages of strategies for further evaluation in 2012. The findings and recommendations also will be included in a progress report that ODOT and DLCD staff will provide to the Oregon State Legislature in January 2012.

Geographic Scope of Analysis: Regional Districts

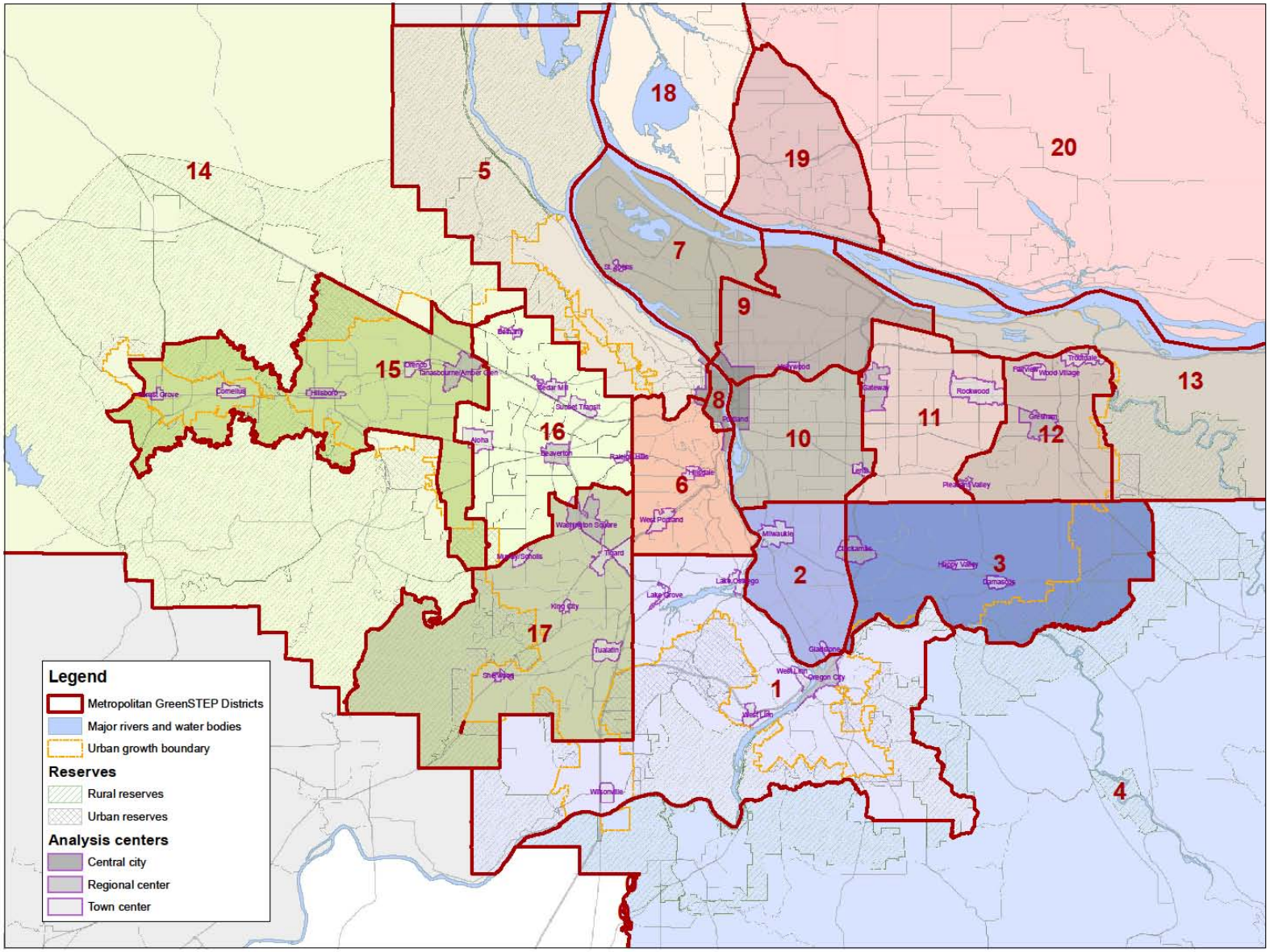
Metropolitan GreenSTEP will run using 20 districts, which provide a comparable structure to the State GreenSTEP model, which runs using the 36 Oregon counties. Figure 2 shows the 20 districts used for this analysis.

Because GreenSTEP calculates greenhouse gas (GHG) emissions from household VMT estimates, Metro adapted the region's 18-district transportation analysis zone (TAZ) map in an effort to define sub-regional geographies with similar travel behavior and land use characteristics. The original 18-district map used TAZs as the base geographic unit. However, in order to have the regional districts nest within county geographies, these boundaries were adjusted to Census tract boundaries. A number of the original 18 districts were adjusted in an effort to keep Regional Centers intact within a single district when possible (most Regional Centers are intact with only a few being intersected by neighboring districts).

In addition, two districts were added in order to better account for local land use and travel characteristics.

1. In Washington County, District 2 was subdivided and District 19 was created to isolate Hillsboro, Forest Grove and Cornelius from the rest of rural Washington County.
2. In Multnomah County, District 13 was subdivided and District 20 was created to isolate Gresham and Troutdale from the rest of Multnomah County.

Figure 2: Metropolitan GreenSTEP 20 Districts Map



Districts 18, 19 and 20 (Clark County, WA) are excluded from this analysis. However, Metro area roadway GHG emissions do account for trips generated from outside the region, including trips from Clark County, WA.

The land use characteristics of the 20 districts influence a number of factors used to estimate household vehicle ownership and vehicle travel. These include the type of area where a household resides (metropolitan, other urban, and rural), population density and urban form characteristics.

Land use characteristics are assigned to households using the following method (from ODOT's GreenSTEP documentation report)[1]:

1. Each household in each county is assigned to one of three land use types - metropolitan, other urban, or rural.
2. The geographic extent of urban growth in metropolitan and other urban areas in each county is calculated.
3. Overall metropolitan, other urban and rural densities are calculated.
4. Households are assigned a Census tract population density based on the overall metropolitan, urban or rural area where it is located.
5. Households in metropolitan areas are designated as being in an urban mixed-use community/neighborhood or not, based on Census tract density and metropolitan goals for urban mixed-use development.

Because the district geographies will be used to calculate the above mentioned background conditions for each of the 20 districts—which in combination with the UGB expansion rates affects the proportion of households in mixed use areas—it is important to net out the land areas that are not designated as developable by 2035 (the planning time horizon of the scenarios project).

After establishing the new district boundaries the following steps were taken to create a net acreage for each district:

1. Total acreage is calculated for each district.
2. Within the UGB, the area designated as parks and rivers is subtracted from the total UGB land area.
3. Outside of the UGB the land area designated as Urban Reserves is added to the net land area in step 2.
4. Outside of the UGB the land area designated as Rural Reserves is subtracted.
5. Similarly, outside of the UGB the Undesignated land area is also subtracted.
6. The land area outside of the Metro MPO boundary, but within a UGB is designated as a "other urban."
7. The remaining land area is identified as Rural.

These seven steps result in the following land area designations by district:

- **"Metropolitan"** includes the land area within the Metro UGB (minus parks and rivers) plus Urban Reserves. This land is the developable land area to be used for the "metropolitan" population density calculation.
- **"Other urban"** includes the land areas within a UGB that are outside of the MPO boundary (conforming to the GreenSTEP model land use definition for "other urban").

[1] Gregor, Brian, ODOT Transportation Planning Analysis Unit, Greenhouse Gas Statewide Transportation Emissions Planning Model (GreenSTEP Model) Documentation, September 2010.

- **"Rural"** designations include all land area outside of the UGB that is a Rural Reserve, Undesignated and/or all remaining county land area that is not included as "metropolitan" or "other urban."

Figure 3 includes the land use designations used for the Phase 1 Metropolitan GreenSTEP scenario runs. It should be noted that assigning a single land use characteristic to each Census tract results in a generalized land use map that does NOT reflect adopted land use policy. Figure 3 only reflects a technical exercise required to provide a generalized land use classification input into the Metropolitan GreenSTEP model. Because the Metro and other UGB boundaries within the tri-county region do not conform to census tract boundaries—and because only a single land use classification can be applied to each census tract—the land use classifications for this model input only roughly resemble UGB boundaries. When a Census tract was bisected by a UGB boundary the classification was designated with the land use type that reflected the majority of the land area within the tract. For example, a tract with two thirds of its land area inside the UGB and one third outside would be designated as "Metropolitan", while if the opposite ratio were to be true, the tract was designated as "Rural".

FIGURE 3

Background demographic characteristics

The 2035 regional household growth forecast assumed in this analysis comes from the Beta 2050 growth forecast prepared by Metro's Data Resource Center in August 2011. The Beta forecast is an interim forecast that will continue to be reviewed and refined in coordination with local governments in the region prior to being considered for adoption by the Metro Council in 2012.

The Beta forecast reflects updated assumptions for redevelopment and infill opportunities and designated urban reserves, and provides the background demographic characteristics that serve as the foundation of the Phase 1 scenarios. The updated assumptions reflect the 2010 Council actions and the urban and rural reserves designated in 2010 and 2011. The Climate Scenarios project will continue to coordinate its technical assumptions with development of the final regional forecast and update the forecast information as data are made available.

While the regional forecast data will be updated as the project progresses it is important to note that within each phase of the project regional population will be held constant across the future year alternative scenarios. All Phase 1 and Phase 2 future scenarios will use the same 2035 population forecast and will not adjust the forecast to test alternative population growth assumptions. The final adopted regional forecast will be used in Phase 3 of the Scenarios Project in 2013. The Metropolitan GreenSTEP results presented in this memo use the forecasted population growth show in Table 2.

Table 2. Metro Beta forecast - Phase 1 2035 population growth assumptions within Metro UGB

2010 Population	2035 Population	Percent change
1.3 million residents	1.8 million residents	35%

These growth rates do *not* reflect the entire region's projected population growth but rather the growth anticipated within the region's urban growth boundary. While Metropolitan GreenSTEP models and estimates the emissions associated with all households within the three-county region, the outputs presented in this memo are associated with the households in census tracts located within the Metro UGB. These growth forecast, and therefore the associated outputs presented below, do not include anticipated growth within the areas of Clackamas, Multnomah, and Washington Counties that are outside of the Metro UGB; or Clark County, WA.

The only exception is for the roadway GHG emissions output. Because the region's target includes roadway GHG emissions, not just regional household GHG emissions, this output captures the emissions associated with all roadway travel within the Metro UGB area, including travel that originated from Clark County, WA. and other areas located outside of the region's urban growth boundary.

Table 2: 2010 Base Year and Alternative Scenarios Inputs

This table summarizes the inputs for the 2010 Base Year and 144 alternative scenarios that reflect different levels of implementation for each category of policies. The inputs were developed by Metro staff in consultation with a technical work group of MTAC and TPAC members. *This information is for research purposes only and does not necessarily reflect current or future policy decisions of the Metro Council, MPAC or JPACT.*

Policy		Inputs			
		2010 Base Year *Reflects existing conditions*	**2035 Level 1 Reference Case** *Reflects current plans and policies*	**2035 Level 2** *Reflects more ambitious policy changes*	**2035 Level 3** *Reflects even more ambitious policy changes*
Community Design	Households living in mixed-use areas and complete neighborhoods[2] (percent)	GreenSTEP calculates			
	Urban growth boundary expansion (acres)	2010 UGB	7,680 acres	7,680 acres	No expansion
	Bicycle mode share for tours 6 miles or less (percent)	2%	2%	12.5%	30%
	Transit service level	2010 service level	2035 RTP Financially Constrained service level	2.5 times RTP service level	4 times RTP service level
	Workers / non-work trips paying for parking (percent)	13% / 8%	13% / 8%	30% / 30%	30% / 30%
	Average daily parking fee ($2005)	$5.00	$5.00	$5.00	$7.25
Pricing	Pay-as-you-drive insurance (percent of households participating and cost)	0%	0%	100% at $0.06/mile	*No change from L2*
	Gas tax (cost per gallon $2005)	$0.42	$0.48	$0.18	
	Road use fee (cost per mile $2005)	$0	$0	$0.03	
	Carbon emissions fee (cost per ton)	$0	$0	$0	$50

[2] This input was calculated internally by the GreenSTEP model.

Policy		Input			
		2010 Base Year *Reflects existing conditions*	**2035 Level 1 Reference Case** *Reflects current plans and policies*	**2035 Level 2** *Reflects more ambitious policy changes*	**2035 Level 3** *Reflects even more ambitious policy changes*
Marketing & Incentives	Households participating in ecodriving	0%	0%	40%	*No change from L2*
	Households participating in individualized marketing programs (percent)	9%	9%	65%	
	Workers participating in employer-based commuter programs (percent)	20%	20%	40%	
	Car-sharing in high density areas (target participation rate)	Participation rate of 1 member/100 people	Participation rate of 1 member/100 people	Double participation to 2 members/100	
	Car-sharing in medium density areas (target participation rate)	Participation rate of 1 member/200 people	Participation rate of 1 member/200 people	Double participation to 2 members/200	
Roads	Freeway and arterial expansion	2010 system	2035 RTP Financially Constrained System	No expansion	*No change from L2*
	Delay reduced by traffic management strategies (percent)	10%	10%	35%	
Fleet	Fleet mix (proportion of autos to light trucks and SUVs)	auto: 57% light truck/SUV: 43%	auto: 56% light truck/SUV: 44%	auto: 71% light truck/SUV: 29%	
	Fleet turnover rate (age)	10 years	10 years	8 years	
Technology	Fuel economy (miles per gallon)	25 mpg	50 mpg	58 mpg	
	Carbon intensity of fuels	90 g CO_2e/ megajoule	81 g CO_2e/ megajoule	72 g CO_2e/ megajoule	
	Light-duty vehicles that are plug-in hybrids or electric vehicles (percent)	auto: 0% light truck/SUV: 0%	auto: 4% light truck/SUV: 1%	auto: 8% light truck/SUV: 2%	

Community Design

Households in Mixed Use Areas or Complete Neighborhoods

In GreenSTEP, the land use characteristics of the area where a household resides affects vehicle ownership and travel. Land use characteristics are defined by three broad land use categories (metropolitan, other urban, rural), population density (persons per square mile) and the urban form characteristics. The last two characteristics (density and urban form) are defined at the census tract level. The GreenSTEP model estimates the proportion of households in mixed-use areas or complete neighborhoods using the following approach[3]:

1. Population densities are calculated from the metropolitan population and the metropolitan area for each Census tract.
2. Density is used as a proxy to identify the urban mixed-use characteristics that affect vehicle travel. Mixed-use household estimates are calculated using a probability model to estimate the percent of households in mixed-use areas based on population density. (A number of urban design and form variables – the "5-Ds" – were tested using National Household Travel Survey data and census tract population density was found to be highly significant and is representative of several urban land use characteristics. These characteristics include neighborhood-level mixing of different land uses, well-connected street system, greater pedestrian accessibility orientation of land uses, and greater transit accessibility.)
3. The proportion of households in mixed-use areas by census tract are then summed by county and divided by total county households to estimate the percent households in mixed-use areas by county.

Complete neighborhoods are characterized by a mix of land uses, interconnected streets to minimize travel distances (particularly walking and bicycling), and sidewalks.

Phase 1 (2011): For all policy levels, an estimate proportion of households in mixed-use areas will be calculated using the following:

- Metropolitan GreenSTEP internal mixed use households probability model (summer 2011)
- Metro interim beta forecast (August 2011)

Phase 2 (2012): For all policy levels, the change in proportion of households in mixed-use areas will be calculated using the following:

- *Envision Tomorrow inputs will override the internal mixed use model in Metropolitan GreenSTEP by establishing control totals)*

Because the UGB expansion rates for all levels reflect a decline from current or historic expansion rates population densities will increase (UGB expansion will not grow at the same rate as population growth). As a result, it is anticipated that the proportion of households in mixed-use areas will also increase (resulting from GreenSTEP's internal mixed-use probability model using density as an indicator variable for neighborhood mixed use characteristics).

[3] Ibid.

The following values reflect Metropolitan GreenSTEP calculated inputs for the proportion of households in mixed-use areas:

Level 1

- 33% (GreenSTEP calculation)

Level 2

- 33% (GreenSTEP calculation)

Level 3

- 34% (GreenSTEP calculation)

Urban Growth Boundary

The geographic extent of metropolitan and other urban areas is calculated from base year measurements of urban growth boundary areas and policy inputs which describe how rapidly urban growth boundaries grow relative to population growth. The following reflect Metropolitan GreenSTEP inputs:

Level 1

- Reflects the change in historic UGB expansion relative to population growth (1990 – 2010: Base year = .375:1) to the adopted reserves decision UGB expansion rate relative to population growth (.15:1). This ratio represents the equivalent of 7,680 acres being added to the current UGB.

Level 2

- Same as Level 1.

Level 3

- No expansion of the urban growth boundary is assumed from 2010.

Bicycle Travel

GreenSTEP models bicycle travel as a component of a class of light-weight vehicles (including bicycles, electric bicycles, Segways and similar) that are small, light-weight and can travel at bicycle speeds or slightly higher than bicycle speeds. This class of vehicles, though currently a minor mode of urban transportation has the potential for having a large impact on transportation emissions in the future. Standard bicycles are the dominant form of light-weight vehicle in use in the United States. This could potentially change as electric bicycles and other light-weight electric vehicles grow in market share. The GreenSTEP light-weight electric vehicles model assumes that light-weight vehicles have the potential for substantially increasing light-weight vehicle travel because they increase the ease and convenience of this mode of travel.

Currently, the only data available for this light-weight vehicle model is bicycle mode share. No distinctions are made between bicycles and electric bicycles and there are no data available on neighborhood electric vehicle or Segway use. Therefore, the input values only represent bicycle mode share.

In addition to identifying regional input data, Metro staff conducted background research on bicycle mode share rates and targets in other U.S. and international cities (see Table 1).

Table 1: U.S. and international bike mode share and targets

City or region	Current bike mode share	Adopted/ Defined bike mode share target
Portland, OR	6% (2009 ACS) 7% (2010 Auditor report work trips)	30% of work trips (Draft Portland Plan)
Corvallis, OR	9.4% (2000 Census)	*None*
Davis, CA	14% (2000 census)	25% of all trips by 2012 (adopted in 2009 bike plan)
Boulder, CO	12.3% (2009 ACS) 7% (2000 census) 15.9% (2009 travel diary survey - includes all trips, not just commute)	Increasing the bicycle mode share (all trips) at least 4% between 1994 (11.3%) and 2020 (1996 bicycle system plan). (Goal has been met according to travel diary survey results.) Other related targets are: 75% non-SOV mode share by 2020 (2008 Transportation plan) zero growth in VMT from 1994 levels.
Eugene, OR	10.8% (2009 ACS)	Approximately 22% (Draft bike/ped plan has defined a target of doubling bike mode share by 2020)
Seattle, WA region	0.90% (2009 ACS) Seattle-Tacoma-Bellevue MSA	*None*
San Francisco, CA region	1.5% (2009 ACS) SF-Oakland-Fremont MSA	None, but they have a goal to increase active transportation activity per day from 8 to 15 minutes by 2040
Nashville, TN region	0.10% (2009 ACS) Nashville –Davidson-Murfreesboro-Franklin MSA	None
Sacramento, CA region	1.6% (2009 ACS) Sacramento-Arden-Arcade-Roseville, MSA	Double the percentage of all trips made by bicycling and walking in the Sacramento Region from 6.6%in 2000 to 13.2% of all trips by 2020. (Modeled data)
Copenhagen, Denmark	37%	50% by 2015

Table 2 provides a summary of US cities (population of 65,000 or more) with the highest bicycle mode share. Table 3 provides comparable data for a sample of international cities.

Table 2: Top US cities commuting bicycle mode share (Only cities with 65,000 + population[4])

City	Population	Bicycle Mode Share
Boulder ,CO	100,160	12%
Eugene, OR	153,275	11%
Fort Collins, CO	138,722	10%
Berkeley CA	102,802	9%
Cambridge, MA	108,776	9%
Missoula, MT	68,875	7%
Gainesville, FL	116,615	6%
Portland, OR	566,606	6%
Somerville, MA	76,489	5%
Madison, WI	235,410	5%
Minneapolis, MN	385,384	4%
Boise, ID	205,698	4%

[4] Source: American Community Survey; American Community Survey only includes cities with populations greater than 65,000

Table 3: Sample of International Cities bicycle mode share

City	Population	Bicycle Mode Share
Groningen	188,000	57%
Delft	96,000	43%
Houten	46,000	42%
Amsterdam	750,000	40%
Copenhagen	520,000	37%
Utrecht	300,000	33%
Bogota	7,500,000	5%
Sydney	4,500,000	2%
Brisbane	2,000,000	2%

Level 1

- The 2035 RTP regional bicycle mode share proportion for all trips lengths 3 miles or less is 2%
- Tour length is less than or equal to 6 miles, which reflects the assumptions for bicycle travel for the Portland Plan and better reflects regionally specific bicycle mode share studies (most reflect a roughly 3 mile trip length; 3 mile trips * 2 = 6 mile tour length).

Level 2

- Based on the Level 3 STS Round 1 scenarios, mode share will increase to 12.5%
- Tour length of 6 miles

Level 3

- Based on the Portland Bike Master Plan for 2030 assumption, mode share will increase to 30%
- Tour length of 6 miles

Level 3 reflects a significantly more aggressive bike mode share than the STS Scenarios in an effort to evaluate whether bike mode share, at a regional scale, might have a larger impact on reducing GHG emissions than it would at a state level.

Transit Service

GreenSTEP uses revenue miles, rather than revenue hours in order to quantify GHG emissions. TriMet defines revenue hours as the amount of time a TriMet vehicle and operator are available to serve passengers. Revenue hours describe how much service is available to customers (Transit Investment Plan Glossary). Revenue miles refer to the distance traveled by a TriMet vehicle when they are available to serve passengers. Revenue miles are used to calculate the emissions associated with the provision of service.

In an effort to reconcile these two transit service variables, revenue miles are converted to vehicle miles, and grouped by age, range of fleet, and assumptions of miles per gallon. These are adjusted by estimated congestion levels, the result of which is transit GHG emissions/mile.

TriMet uses revenue hours because it better reflects costs, which makes conversion of revenue hours to revenue miles difficult given revenue hours shift over time due to congestion. However, based on TriMet annual revenue mile and revenue hour data TriMet staff calculated a regional conversion rate of 14 revenue miles per revenue hour.

This conversion rate is based on TriMet annual data on revenue miles and revenue hours for bus-only for the system as a whole from RY1971 to FY2010. In FY10, the figure was 14.68 revenue miles per revenue hour. When assessed on a year-to-year change in revenue miles per revenue hour, there is a very small downward trend. Taking out two years of extreme outliers, the trend during this 40 year period, if continued into the future, would result in 14.06 revenue miles per revenue hour in FY2035. (See Table 4; NOTE: Table 4 does *not* represent a Metropolitan GreenSTEP input level but rather provides an example of how revenue hours are converted to revenue miles.)

Table 4: Ratio of transportation service expansion to population growth (w/revenue mile conversion rate)

Demonstration example: conversion of revenue hours to revenue miles		2005	2035	Percent increase	Ratio (revenue mile growth : population growth)
TriMet service district	Population estimate	1,543,910	2,333,604	51%	
	Revenue Hours	*3,073,579*	*4,433,847*	*44%*	
	Conversion rate (revenue hours to revenue miles)				**.86:1**
	14 RM/RH				
	Revenue Miles	43,030,106	62,073,858	44%	

Level 1

- Reflects current TriMet service trend line comparing service mile per capita, roughly a 1:1 ratio of fixed and bus route transit service growth compared to population growth (see Chart 1). This ratio represents the equivalent of 29 revenue miles per capita.
- The percent of transit service growth that is electrified reflects the current revenue mile mode split of 80/20, which represents 80% B-5 biodiesel and 20% electric.

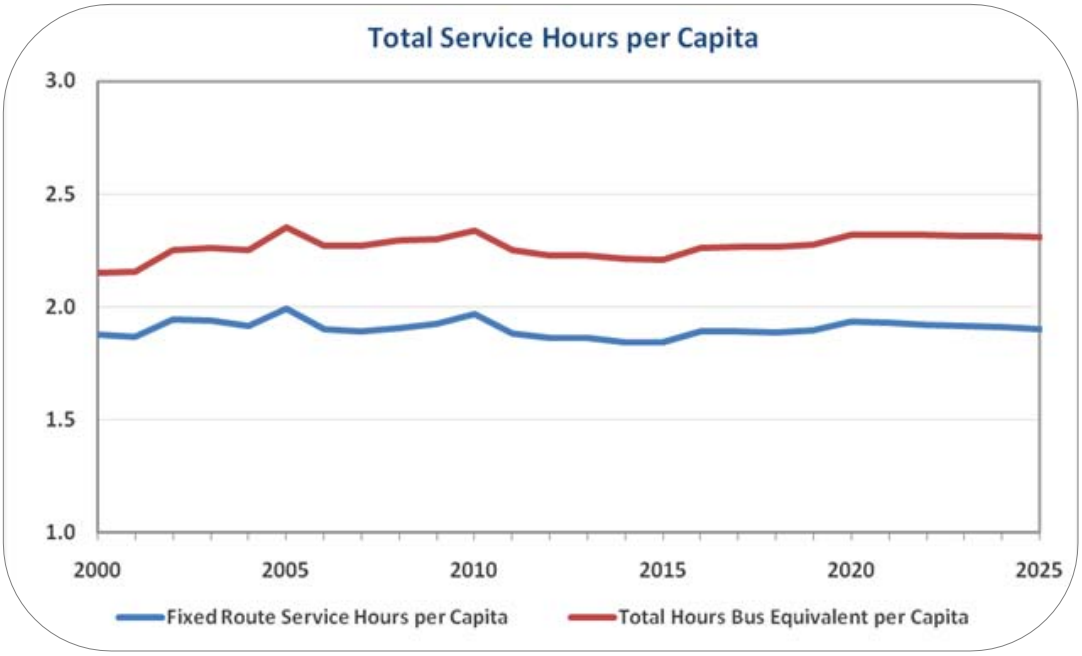
Level 2

- Reflects the Level 3 input value in the RTP transit investment scenario (Scenario B), with a ratio of 2.4:1 service mile growth compared to population growth. This ratio represents the equivalent of 69 revenue miles per capita.

Level 3

- A 4:1 ratio of transit service mile growth compared to population growth, which is more aggressive than the transit scenario analysis conducted for the 2035 RTP. This ratio represents the equivalent of 115 revenue miles per capita.

Figure 3: TriMet total service hours per capita (fixed and bus routes), projected 2000 – 2025



The results of the 2035 RTP transit scenario analysis yield a 2.4:1 ratio of service mile growth compared to population growth. This ratio was calculated by first using TriMet's service hour bus capacity equivalents to calculate the total service hour growth from 2005 to 2035 by mode (light rail, bus, streetcar, commuter rail) in bus service hour equivalents (common unit). These equivalents were summed to calculate a subsequent growth rate, after converting revenue hours to revenue miles. The total revenue hours for 2005 and 2035 are shown in Table 5 for reference. The resulting growth rate of 2.4:1 is less than the proposed 3:1 ratio, which represents a tripling of service levels.

Table 5: 2035 RTP transit investment scenario (Scenario B)

RTP Scenario B		2005	2035	Percent increase	Ratio (revenue mile growth : population growth)
	UGB Population estimate (from RTP)	1,408,207	2,039,195	45%	
	Revenue Hours	8,092	16,865	108%	
	Conversion rate (revenue hours to revenue miles)				**2.4:1**
	14 RM/RH				
	Revenue Miles	113,288	236,110	108%	

To help put the transit service level growth projections for Level 2 and Level 3 into context, TriMet staff sought to identify other regions whose current capacity-weighted per capita service levels represent roughly the same level of service projected using this growth rate. In other words, Level 2, for example, seeks to answer the question, "If transit service levels were to grow at a 2.4:1 ratio until 2035, what other regions' levels of service would this be similar to?"

For this analysis, TriMet staff assessed the per capita capacity-weighted service provision of other regions using data from the 2009 National Transit Database, using a capacity adjustment factor of 4.87 to account for higher-capacity modes such as heavy rail, light rail, and commuter rail.

This capacity adjustment factor is based on TriMet's current MAX-bus capacity ratio (MAX light rail vehicles have 4.87 times the capacity of a bus), as a means of simulating the levels of service likely to be provided in the Portland region. That is, while other regions provide heavy rail service with 8 to 10-car trains with substantially more capacity than MAX, it is assumed for this exercise that constraining the additional vehicle capacity to current MAX levels is more realistic and appropriate for purposes of this analysis.

Using this approach, TriMet staff assessed comparable regions on the basis of both Vehicle Revenue Hours and Vehicle Revenue Miles on a per capita basis to adjust for population growth. This analysis provided a range of results due to differences in the nature of the regions' services (e.g., long-haul commuter rail services vs. downtown core services) as well as in the ratio of regions' vehicle miles to vehicle hours. The results of the analysis are summarized in Table 6.

Table 6: Regional capacity-weighted transit service provisions, National Transit Database 2009

UZA Name	2009 Capacity-Weighted Vehicle Revenue Miles (VRM) (Thousands)	2009 Capacity-Weighted VRM/capita	**Growth ratio needed to equalize (x:1)**	2009 Capacity-Weighted Vehicle Revenue Hours (VRH) (Thousands)	2009 Capacity-Weighted VRH/capita	**Growth ratio needed to equalize (x:1)**
New York-Newark, NY-NJ-CT	2,990,712	168.0	**4.2**	154,295	8.7	**3.0**
Chicago, IL-IN	650,339	78.3	**2.0**	34,060	4.1	**1.4**
Washington, DC-VA-MD	430,460	109.4	**2.7**	20,139	5.1	**1.8**
San Francisco-Oakland, CA	448,781	139.0	**3.5**	19,055	5.9	**2.0**
Portland, OR-WA	63,377	40.0	**1**	4,580	2.9	**1**

The ranges of Service Mile and Service Hour Growth Ratios need to equalize for the Chicago region, the San Francisco Bay Area and the Washington, DC region support the use of the 2.4:1 ratio in Level 2, while the range for New York City region supports the use of 4:1 for Level 3.

Parking fees

GreenSTEP considers parking pricing is a trip-based cost. It is assumed that parking costs are commonly paid for at one or both ends of a trip, and sometimes paid for on a monthly basis. GreenSTEP includes parking pricing as a component of the trip costs for auto travel, but in a more general way than traditional urban travel demand models. There are two types of parking costs addressed in GreenSTEP; (1) parking costs at places of employment and (2) non-work parking costs. Daily parking costs are calculated for each household by estimating the proportion of work and non-work trips with parking factors for each household. These annual parking costs are then added in with other variable transportation costs.

Table 7 provides a summary of the calculated average regional daily parking cost in 2005 dollars and the proportion of work trips where parking factors exist for the 2010 base year and 2035 reference case. All population and employment data are from the 2035 RTP forecast and do not represent 2010 Census

figures (these values will change slightly based on regional population and employment differences between the 2035 RTP forecast and the forthcoming draft interim forecast).

The following description outlines the approach for calculating these regional averages.

1. Sum of total employment for the 4-County area
2. Calculate total employment in the TAZs where a parking factor exists
3. Calculate percent of employees who have to pay for parking (total employment in TAZ with Parking factor divided by total employment)
4. Calculated a weighted average long-term parking "cost" for employment in TAZs with parking factors. This is calculated by multiplying the total employment in each TAZ by the parking factor for each TAZ, and then dividing that total by #2 above.
5. Same as #4, only using short-term parking "cost" (typically 50% of long-term).
6. This is the straight average of #4 and #5.

The following table was prepared using data from Metro's Research Center at the Transportation Analysis Zone (TAZ) level.

Table 7: Regional parking cost, weighted average for work and non-work trips in 2005 dollars

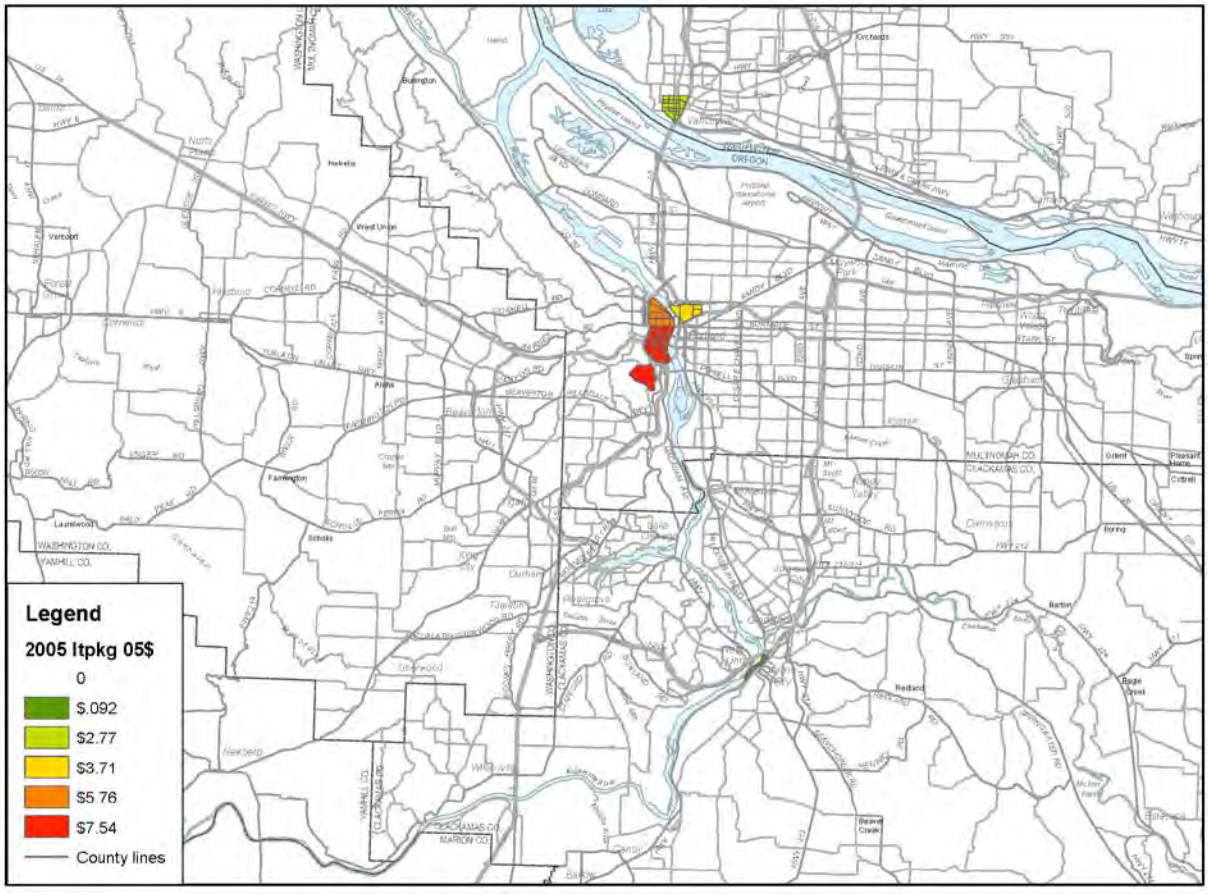
Parking factor approach	**2005**	**2010**	**2035**
1. Total Regional Employment	1,032,246	917,296	1,799,152
2. Employment in TAZs w/ parking factors	142,712	122,770	559,145
3. Regional % of Employment in TAZ w/parking factors	13.8%	13.4%	31.1%
4. Long-term cost, 2005 $ (weighted average for employees in TAZ w/parking factors)	$6.50	$6.52	$5.13
5. Short-term cost, 2005 $ (weighted average for employees in TAZ w/parking factors)	$3.25	$3.25	$2.91
6. Average cost assuming even split, 2005 $ (long-term/short-term)	**$4.87**	**$4.89**	**$4.02**

Note: the 2035 average parking cost is lower because smaller parking factors are scattered throughout the region instead of having fewer, higher valued factors focused in the Central City. Overall, the "cost" is less, but more employment is located in TAZs with parking factors (31% vs. 13.8%).

Level 1

- The percent of workers paying a parking fee reflects current (2010) modeled estimates from the 2035 RTP (13%) (see Figure 1 and Table 8).

Figure 1: 2005 Long Term Parking Factors (2005 $), 2035 RTP



- The percent of non-work trips paying parking fees reflects current (2010) modeled estimates from the 2035 RTP (8%)
- The average daily cost ($5) also reflects current modeled estimates from the 2035 RTP (in 2005$) and captures work and non-work parking factors.

Level 2

- Level 2 tests the affect of increasing the parking fee coverage area (based on the 2035 RTP), without adjusting parking costs (see Figure 2 and Table 8).
- The percent of workers paying a parking fee reflects future modeled estimates from the 2035 RTP (30%).
- The percent of non-work trips paying parking fees reflects future modeled estimates from the 2035 RTP (30%).
- The average daily cost ($5) deviates from the future 2035 modeled estimate in the RTP ($4) to maintain directional consistency with all other Metropolitan GreenSTEP input variables (all input variables increase by level. It is not anticipated that this adjustment will result in a large deviation from adopted policy, nor will it result in significantly altered scenario results).

Figure 2: 2035 Long Term Parking Factors (2005 $), 2035 RTP

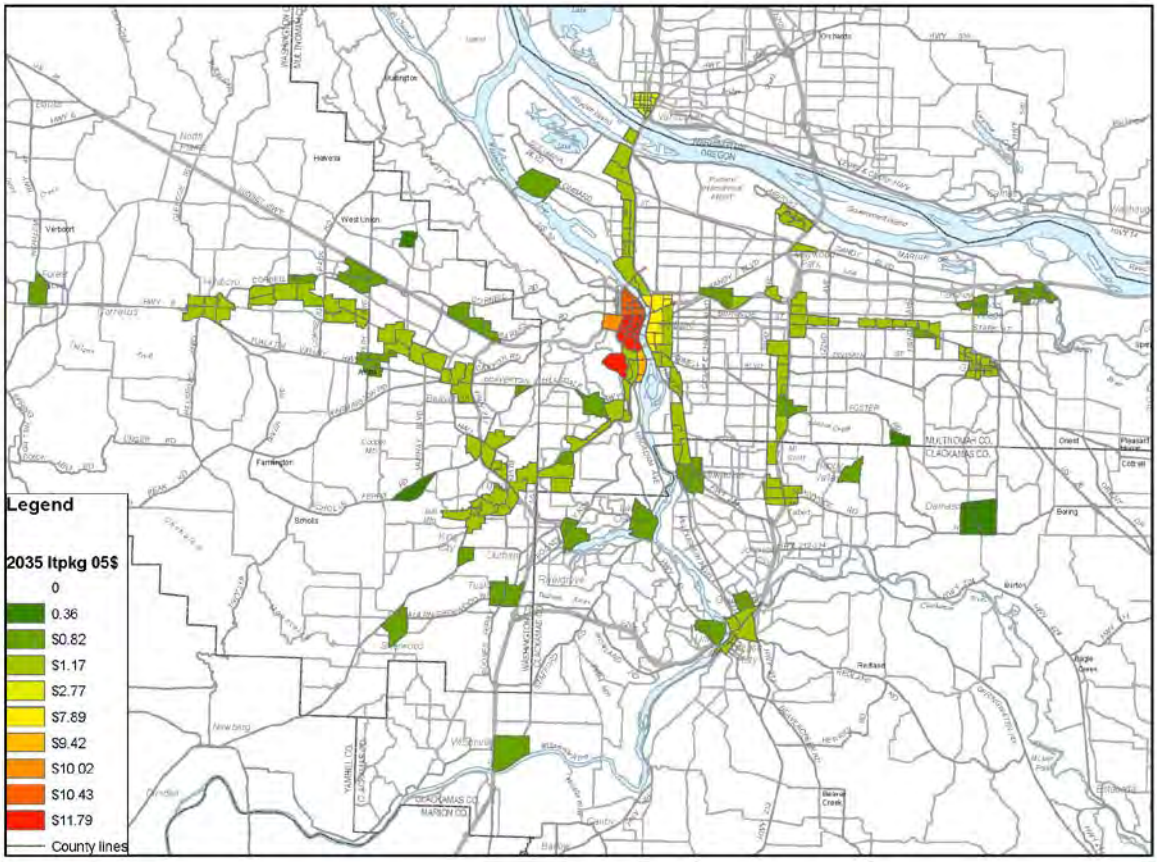


Table 8: Level 2 2035 proportion of regional trips with parking factor, work and non-work

Share of trips with parking factors		
	Work trips	Non-Work trips
Level 1	13%	8%
Level 2	30%	30%
Percent change	*138%*	*263%*

Level 3

- Level 3 tests the affect of increasing parking costs, without adjusting the parking coverage area.
- The percent of workers paying a parking fee reflects the Level 2 input value from the 2035 RTP (30%).
- The percent of non-work trips paying parking fees reflects the Level 2 input value from the 2035 RTP (30%).
- Based on the 2035 RTP, the City of Portland parking price increases roughly 1.5% per year over inflation (since 1994). The average parking price in 2035 for Level 3 assumes this growth rate from 2005 (see Table 9).

Table 9: Parking pricing increase for Level 3

2005 parking cost	1.5% annual increase over 25 years
$5	$7.25

Pricing

Pay as you drive insurance

This pricing strategy converts a portion of liability and collision insurance from dollars-per-year to cents-per-mile (or cents-per-minute/hour if advanced tracking technology is utilized) to charge insurance premiums based on the total amount of miles driven per vehicle on an annual basis and other important rating factors, such as the driver's safety record. If a vehicle is driven more, the crash risk consequently increases.

Description of pay-as-you-drive (PAYD) insurance from the GreenSTEP documentation report[5]: "PAYD insurance is automobile insurance that is paid strictly on a mileage traveled basis, rather than on a lump-sum periodic basis. On average, PAYD insurance does not change the amount that households pay for insurance. However, since the cost of PAYD to the motorist varies with the number of miles driven, there is an incentive to reduce travel to save money. It has been estimated that a PAYD insurance rate of 4 to 6 cents per mile, could reduce VMT from light vehicles by about 3.8%.[6] The estimates of the effect of PAYD insurance is on based on assumptions about the price elasticity of vehicle travel. The right value to use is uncertain.[7] Since GreenSTEP treats variable costs as a budget effect, price elasticity depends on the sum of all variable costs, therefore the estimated effect of PAYD insurance will depend on what other costs are being paid as well."

Level 1

- Reflects current policy - no participation in pay as you drive insurance options
- No cost associated with pay as you drive insurance

Level 2

- Reflects the Level 2 input value in the STS Round 1 Scenarios analysis (100% of households participate in pay as you drive insurance programs). The intent of this level is to test the impact of a relatively new and untested policy strategy.
- Reflects the Level 2 input value in the STS Round 1 Scenario analysis ($.06/mile).

Gas tax, mileage-based road use fee & carbon emissions fee

The model inputs for the gas tax, and road use and carbon emissions fees were developed with the goal to better understand the relationship between these three pricing mechanisms. First, it is assumed that the current gas tax mechanisms do not provide stable revenue streams when considering the effects of increased fuel efficiency and inflation. While the pricing mechanisms tested in the Phase 1 scenarios do not provide guidance on how transitioning to alternative pricing mechanisms can address this issue, they do provide insight into how improvements in fuel efficiency may effect revenue generation.

[5] Gregor, Brian, ODOT Transportation Planning Analysis Unit, Greenhouse Gas Statewide Transportation Emissions Planning Model (GreenSTEP Model) Documentation, September 2010.
[6] U.S. Department of Transportation, Report to Congress, Transportation's Role in Reducing U.S. Greenhouse Gas Emissions, Volume 2: Technical Report, April 2010, pp. 5-22
[7] U.S. Department of Transportation, Report to Congress, Transportation's Role in Reducing U.S. Greenhouse Gas Emissions, Volume 1: Synthesis Report, April 2010, pp. 3-15.

Table 10: Background calculations for gas tax, carbon emissions & vehicle travel fee inputs (Levels 1–3)

Pricing mechanism	Level 1 Cost (2005 Dollars)	Level 2 Cost (2005 Dollars)	Level 3 Cost (2005 Dollars)
2010 Federal gas tax ($/gallon)	$ 0.18	$ 0.18	$ 0.18
2011 State gas tax ($/gallon)	$ 0.30		
Road use fee ($/mile)		$ 0.03	$ 0.03
Carbon emissions fee ($/ton)[8]			$ 50.0

Because all pricing inputs are in 2005 dollars it is assumed (within Metropolitan GreenSTEP) that the pricing mechanisms discussed below are adjusted to account for inflation between 2005 and 2035. It is also important to note that the costs per mile presented in tables 11-13 should not be used to estimate revenue generation for each scenario without also considering changes in DVMT. Further analysis will be completed during Phase 2 to better understand the role of these pricing mechanisms in supporting reinvestment of revenues generated to address implementation costs and anticipated funding shortfalls for achievement of existing plans and policies.

Base year

- In 2010, State and Federal gas taxes were $.42/gallon, assuming a $.24/gallon state gas tax and an $.18/gallon federal gas tax.

Level 1

Level 1 represents existing pricing mechanisms, which demonstrate a declining revenue stream based on anticipated fuel efficiency and technology gains (including Level 1 technology levels).

- In 2011, the State gas tax was increased to $.30/gallon while the Federal gas tax did not change. The input value for level 1 reflects this State gas tax increase, with a combined gas tax of $.48/gallon.
- No road use fee is assumed for Level 1 (no current policy).
- No carbon emissions fee is assumed for Level 1 (no current policy).

Level 2

Level 2 represents an attempt to model the pricing mechanisms needed to maintain a level State revenue source based on current policies (current state gas tax and average fuel efficiency). Because these pricing mechanisms have not previously been tested using Metropolitan GreenSTEP, the following assumption represents an attempt to model the transition from the state gas tax to a mileage-based road use fee.

- The current Federal gas tax ($.18/gallon) is applied as a cost/gallon (declining revenue).
- Level 2 includes the current $.30/gallon tax[9] and an annual increase of $.01 per year ($.55/gallon in 2035), which reflects the financial assumptions used in the 2035 RTP.[10] However, these gas tax assumptions are modeled as a cost per mile equivalents. In addition, the road use fee was rounded to $.03/mile to better test the affects of different pricing mechanisms (by rounding up to $.03/mile, there is a greater distinction between Levels 1 and 2).

[8] Cambridge Systematics, Inc. *White Paper: Costs of Motor Vehicle Travel*. Prepared for ODOT for the purpose of modeling Statewide Transportation Scenarios. Accessed at http://www.oregon.gov/ODOT/TD/OSTI/docs/TAC/Sept22/WP.pdf

[9] As provided for in the Oregon Jobs for Transportation Act (House Bill 2001).

[10] ODOT Financial Services Policy and Economic Analysis Unit, Financial Assumptions for the development of Metropolitan Transportation Plans 2005 - 2030, 2004.

- No carbon emissions fee is assumed for Level 2.

Level 3

Level 3 reflects a pricing strategy that converts the State gas tax to a road use fee (consistent with Level 2), and begins to account for the estimated external climate costs of greenhouse gas emissions.

- The current Federal gas tax ($.18/gallon) is applied as a cost/gallon (declining revenue).
- The vehicle travel fee reflects the Level 2 input value of $.03/mile (2011 State gas tax plus a 1.5% gas tax increase, in cost per mile equivalents).
- The carbon emissions fee represents an estimated value of the external costs of transportation GHG emissions ($50/Ton CO_2e).[11]

Tables 11-13 demonstrate the implications of fuel efficiency changes relative to the pricing mechanisms tested in Phase 1[12].

Table 11: 2010 Base Year fuel efficiencies, cost per mile equivalent [13]

Pricing mechanism	Level 1 Cost (2005 Dollars)	Level 2 Cost (2005 Dollars)	Level 3 Cost (2005 Dollars)
2010 Federal gas tax ($/mile)	$ 0.007	$ 0.007	$ 0.007
2011 State gas tax ($/mile)	$ 0.012		
Road use fee ($/mile)		$ 0.03	$ 0.03
Carbon emissions fee ($/mile)[14]			$ 0.018
Total (rounded)	**$ 0.02**	**$ 0.04**	**$ 0.06**

Cost per mile equivalents

Table 12: 2035 Level 1 estimated fuel efficiencies, cost per mile equivalent [15]

Pricing mechanism	Level 1 Cost (2005 Dollars)	Level 2 Cost (2005 Dollars)	Level 3 Cost (2005 Dollars)
2010 Federal gas tax ($/mile)	$ 0.004	$ 0.004	$ 0.004
2011 State gas tax ($/mile)	$ 0.006		
Road use fee ($/mile)		$ 0.03	$ 0.03
Carbon emissions fee ($/mile)			$ 0.01
Total (rounded)	**$ 0.01**	**$ 0.03**	**$ 0.04**

[11] ODOT, Statewide Transportation Strategy (STS) Technical Advisory Committee meeting, 5/31/11 (value from forthcoming Cambridge Systematics report on external costs to households related to their vehicle travel, Date TBD)

[12] State GreenSTEP input assumption for the Portland Metro area (the average fuel efficiency for all light vehicles is not weighted by proportional share of light trucks to automobiles)

[13] Assuming average fuel efficiency of 25 mpg, which reflects the State GreenSTEP input assumption for the Portland Metro area (the average fuel efficiency for all light vehicles is not weighted by proportional share of light trucks to automobiles)

[14] All carbon emissions fee cost per mile estimates assume 19.4 lbs CO2/gallon. Accessed at: www.epa.gov/otaq/climate/420f05001.htm

[15] Assuming average fuel efficiency of 50 mpg, which reflects the State GreenSTEP Reference Case input assumption for the Portland Metro area (the average fuel efficiency for all light vehicles is not weighted by proportional share of light trucks to automobiles)

Table 13:2035 Level 2 estimated fuel efficiencies, cost per mile equivalent[16]

Pricing mechanism	Level 1 Cost (2005 Dollars)	Level 2 Cost (2005 Dollars)	Level 3 Cost (2005 Dollars)
2010 Federal gas tax ($/mile)	$ 0.003	$ 0.003	$ 0.003
2011 State gas tax ($/mile)	$ 0.005		
Road use fee ($/mile)		$ 0.03	$ 0.03
Carbon emissions fee ($/mile)			$ 0.01
Total (rounded)	**$ 0.01**	**$ 0.03**	**$ 0.04**

Marketing

Individualized marketing programs

Individualized marketing (IM) programs are travel demand management programs focused on individual households. IM programs involve individualized outreach to households that identify household travel needs and ways to meet those needs with less vehicle travel.

Level 1

- Reflects the current results of the City of Portland and Regional Travel Options (RTO) Individualized Marketing Program (given current funding); 9% of households in the region participate in an Individualized Marketing Program.

Level 2

- Reflects the Financially Constrained 2035 RTP "percent covered households" 65%. This represents the percent of households (peak) within ½ mile of a light rail transit stop or ¼-mile of a bus stop.

Employee commute options programs

Employee commute options (ECO) programs are work-based travel demand management programs. They may include transportation coordinators, employer-subsidized transit passes, bicycle parking, showers for bicycle commuters, education and promotion, carpool and vanpool programs, etc.

Research conducted using the Washington State Commute Trip Reduction (CTR) database provide a detailed information on both TDM strategies implemented by employer, worksite characteristics and employees' travel behavior and their job related characteristics. Similar to Oregon, employers in the state of Washington that have 100 or more full-time employees are required to implement a Commute Trip Reduction program. The state CTR database tracked more than 1,000 worksites and around 300,000 individual employees from 1993 to 2005. The analysis of the longitudinal CTR data indicates that for the employees affected by a CTR program, the participation rates of compressed work week increased steadily from 14.5 percent in 1993 to 20 percent in 2005. This evaluation focused on one TDM strategy, and may underestimate the participation rate when taking into account the range of employer-based

[16] Assuming average fuel efficiency of 58 mpg, which reflects the State GreenSTEP input assumption used to determine the Metro region's GHG emissions reduction target (the average fuel efficiency for all light vehicles is not weighted by proportional share of light trucks to automobiles).

TDM programs available – parking cash out, telecommuting, transit passes, preferential parking for carpools and vanpools, etc.[17]

Level 1

- Reflects the best available data for current regional participation in ECO programs; 20% of working age persons participate in an ECO program.
- Assumes a steady participation rate while accounting for population growth.
- While Metro's current Regional Travel Options program estimates roughly 20% of the region's workforce has access to a transportation options program, this value does not reflect all worksites that meet the State ECO Rule threshold (sites with 100+ employees) in the region. In addition, this estimate does not account for regional participation rates. Given these limitations, and based on the research discussed above, it is assumed that the RTO access rate underestimates regional access and potential participation rates.

Level 2

- Demonstrates an increase in participation rate of 40% (doubling of Level 1), which could reasonably be accomplished with increased programmatic resources/funding and would not require a legislative change to the State ECO Rule.

Car-sharing

Because car-sharing is a relatively new phenomenon, GreenSTEP models the approximate effects of car-sharing on vehicle travel (there is currently no National Household Travel Survey data on car-sharing). However, based on *Moving Cooler*, it is assumed that on average there are 20 participating households per car-share vehicle.[18] By using this participation rate per car-share vehicle, the target number of "car-share" households is calculated in GreenSTEP using a rate of 2,000 inhabitants of medium-density census tracts and 1,000 inhabitants for high-density census tracts.

No low-density target is set for GreenSTEP because of the synergistic relationship between density and car-share participation rates. In other words, if the participation rate for an average car-share vehicle is 20 households, the lower the density the greater the catchment area needs to be to meet the participation rate. This would result in the walk distance for a participating household to increase beyond a reasonably expected distance. However, because of the synergistic relationship within GreenSTEP between density car-share participation, the VMT (and GHG) benefits of car-share programs can be tested through the community design policy lever (as low-density areas meet the medium-density population threshold the average car-share participation rates are assumed within GreenSTEP). The car-share input variable is the estimated population needed per vehicle to support a viable car-share market.

Level 1

- The input value of 10,000 people per car-share vehicle in medium density areas reflects the State's input assumptions for the 1st round of STS scenarios (the best available data).

[17] Zhou, Liren, University of South Florida. *Modeling the impacts of an employer based travel demand management program on commute travel behavior*. Thesis and Dissertations, Paper 581. University of South Florida, June, 2011, p. 46.

[18] Cambridge Systematics, "Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions", Urban Land Institute, Washington, D.C., October 2009.

- The input value of 5,000 people per car-share vehicle in high density areas reflects the State's input assumption for the 1st round of STS scenarios (the best available data).

Level 2

- The input value of 5,000 people per car-share vehicle in medium density areas reflects the State's input assumptions for the 1st round of STS scenarios (the best available data).
- The input value of 2,500 people per car-share vehicle in high density areas deviates from the State's input assumption for the 1st round of STS scenarios. The rationale for using a value other than the State's input assumption is to test a comparable order of magnitude difference between the levels 1 and 2 for both medium and high density areas.

NOTE: The State did not model this input for the Agency Technical Report, the scenario runs used to establish the Metro Region's GHG emissions reduction target. Therefore, modifying the input assumption for this variable does not limit Metro's ability to consistently evaluate the region's conformity to the GHG emissions reduction target.

Eco-driving

Eco-driving involves educating motorists on how to drive in order to reduce fuel consumption and cut emissions. Examples of eco-driving practices include avoiding rapid starts and stops, matching driving speeds to synchronized traffic signals, and avoiding idling. Practicing eco-driving also involves keeping vehicles maintained in a way that reduces fuel consumption such as keeping tires properly inflated and reducing aerodynamic drag. For the purposes of GreenSTEP, fuel economy benefits of improved vehicle maintenance are included in the eco-driving benefit. The effect of eco-driving programs is modeled by identifying participating households based on a policy assumption about the proportion of participating households. A default 19% improvement in vehicle fuel economy is assumed within the GreenSTEP model based on information in the "Moving Cooler" study.[19]

Level 1

- Because eco-driving is a relatively new phenomenon and there is currently no existing regional eco-driving marketing program, there is no supporting data to indicate the proportion of households that follow eco-driving practices; 0% households follow eco-driving practices.

Level 2

- Given current data limitations for this GHG emissions reduction strategy, Level 2 reflects the input assumption for the 1st round of STS scenarios; 40% of households follow eco-dirving practices.

Roads

System management

GreenSTEP models mean travel speeds with and without incidents to compute an overall average speed by road type and congestion level. The approach provides a simple level of sensitivity testing of the potential effects of system management programs on GHG emissions. Overall average speeds by congestion level are calculated based on input assumptions about the degree of system management,

[19] Cambridge Systematics, "Moving Cooler", Urban Land Institute, Washington, D.C., 2009, Technical Appendix, Table 7.1, page B-63.

which includes traffic signal timing and incident management. The input is defined as the percent of delay addressed through system management.

Level 1

- There is no existing regional data or modeling assumptions available for this input. Level 1 reflects the input assumption for the 1st round of STS scenarios; 10% of delay is addressed through system management.

Level 2

- Reflects the input assumption for the 1st round of STS scenarios data set that accounts for the percent of delay addressed through system management programs; 35% of delay is addressed through system management

Road capacity

The road capacity input in GreenSTEP only models the affect of roadway expansion relative to population growth. GreenSTEP does not reflect the impact of street connectivity projects. Metropolitan area freeway supply (lane-miles per capita) is a significant predictor of metropolitan household vehicle ownership and travel, however arterial supply (lane-miles per capita) is not. Both freeway and arterial lane-mile supply are important inputs for estimating traffic congestions levels. GreenSTEP calculates future year growth rates of freeway and arterial lane miles relative to metropolitan area population growth rates, from a defined inventory of lane-miles.

Level 1

- Reflects the 2035 financially constrained RTP (see Table 14)

Level 2

- No change from level 1 (2035 financially constrained RTP)

Level 3

- No roadway expansion relative to population growth

Table14: Ratio of road expansion to population growth

Regional Transportation Plan		2005	2035	Percent increase	Ratio (lane mile growth : population growth)
2035 RTP Financially Constrained	Population estimate	1,961,153	3,096,746	58%	
	Freeway lane miles	1,206	1,318	9%	**.16:1**
	Arterial lane miles	8,416	8,921	6%	**.10:1**
2035 State RTP network	Population estimate	1,961,153	3,096,746	58%	
	Freeway lane miles	1,206	1,318	9%	**.16:1**
	Arterial lane miles	8,416	8,996	7%	**.11:1**

Fleet

All fleet assumptions reflect the values defined in the State Agency Technical Report and assumed in the Metropolitan GHG Reduction Targets Rule.

Auto/light truck proportions

The vehicle type model in GreeenSTEP calculates the likelihood that a vehicle is a light truck, by county; based on National Household Travel Survey data, western states tend to have higher light truck (pickups, vans, sport utility vehicles) ownership than the U.S. national average.

Level 1

- Reflects the Level 1 values used in the 1st Round of STS scenarios, by county; Clackamas 51%, Multnomah 42%, Washington 46% (regional average of 43%).

Level 2

- Reflects the Level 3 values used in the 1st Round of STS scenarios, by county (assumed in the Metropolitan GHG Reduction Targets Rule; Clackamas 34%, Multnomah 28%, Washington 31% (regional average of 29%).

Fleet turnover rate

Fleet turnover reflects the rate at which new vehicles will replace exiting vehicles. Since newer vehicles are typically more fuel efficient than older vehicles, newer fleets will yield greater GHG reductions.

Level 1

- Reflects the Level 1 value used in the 1st Round of STS scenarios.
- Captures the current replacement rate observed statewide, 10 years to replace vehicle, as reported in the Agency Technical Report.

Level 2

- Reflects the Level 3 value used in the 1st Round of STS scenarios.
- Captures the current replacement rate observed in other parts of the country, 8 years to replace vehicle, as reported in the Agency Technical Report; about a year or older than other parts of the country.

Technology

All technology assumptions reflect the values defined in the State Agency Technical Report and assumed in the Metropolitan GHG Reduction Targets Rule.

Fuel economy

The fuel economy values, used in the Agency Technical Report, assume the current Federal Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards for Model Years 2017-2025.

Level 1

- Reflects the Level 1 value used in the 1st Round of STS scenarios.
- The 2035 light-duty vehicle fuel economy is estimated to be 59.7 mpg and light truck is 41 mpg; regional fleet average is 50 mpg.

Level 2

- Reflects the Level 3 value used in the 1st Round of STS scenarios.
- The 2035 light-duty vehicle fuel economy is estimated to be 68.5 mpg and light truck is 47.7 mpg; regional fleet average is 58 mpg.

Carbon intensity of fuels

The values for carbon intensity of fuels, used in the Agency Technical report, assume the proposed low carbon fuel standard is adopted. These assumptions are modeled in the 1st Round of STS Scenarios and used for the Metropolitan GHG Reduction Targets Rule.

Level 1

- Reflects the Level 1 value used in the 1st Round of STS scenarios.
- Assumes the carbon intensity of vehicle fuels will be 10% below the current average by 2035.

Level 2

- Assumes the carbon intensity of vehicle fuels will decline to a level 20% below the current average by 2035.
- Reflects the Level 3 value used in the 1st Round of STS scenarios.

Electric vehicles market share

The values for this technology input represent the proportion of electric vehicles (EV) as a share of total fleet that are driven within the average range of EVs, by model year as documented in the Agency Technical Report and used in the 1st Round of STS Scenarios.

Level 1

- Reflects the Level 1 value used in the 1st Round of STS scenarios.
- Assumes 26% of the 2035 model year for autos, that are driven within the average range of EVs for that model year (175 miles) are EVs.
- Assumes 26% of the 2035 model year for light trucks, that are driven within the average range of EVs for that model year (175 miles) are EVs.

Level 2

- Reflects the Level 3 value used in the 1st Round of STS scenarios.
- Assumes 26% of the 2035 model year, that are driven within the average range of EVs for that model year (175 miles), are EVs.

Plug-in hybrids market share

The values for technology this input represent the proportion of plug-in hybrids as a share of total fleet that are driven within the average range of EVs, by model year as documented in the Agency Technical Report and used in the 1st Round of STS Scenarios.

Level 1

- Reflects the Level 3 value used in the 1st Round of STS scenarios.
- Assumes 4% of the 2035 model year for autos, that are driven within the average range of plug-in hybrids for that model year (175 miles), are plug-in hybrids.

- Assumes 1% of the 2035 model year for light trucks, that are driven within the average range of plug-in hybrids for that model year (175 miles), are plug-in hybrids.

Level 2

- Reflects the Level 3 value used in the 1st Round of STS scenarios.
- Assumes 8% of the 2035 model year for autos, that are driven within the average range of plug-in hybrids for that model year (175 miles), are plug-in hybrids.
- Assumes 2% of the 2035 model year for light trucks, that are driven within the average range of plug-in hybrids for that model year (175 miles), are plug-in hybrids.

Materials following this page were distributed at the meeting.

Regional Industrial Lands Inventory Findings

November 8, 2011

Project Purpose

- **Vacant, large lot industrial sites** critical to expanding and locating traded-sector companies resulting in jobs and tax base

- Determine supply and readiness of large lot industrial sites **within the Metro region**

- Inform the work of local jurisdictions, Community Investment Initiative Leadership Council, Greater Portland, Metro, the Port of Portland, and the State

- Lay foundation for innovative financing tools and approaches to meet market demand

Project Management Team

- Representatives from the **Port, Business Oregon, Metro, Portland Business Alliance, and NAIOP**
- Extensive experience in industrial development and planning
- Focus on how to meet market demand
- Consensus decisions on criteria and tiering for inventory
- Consultation throughout the process with:
  - Local planners,
  - Economic development practitioners,
  - Brokers,
  - Regulators, and
  - Industry groups

Project Overview

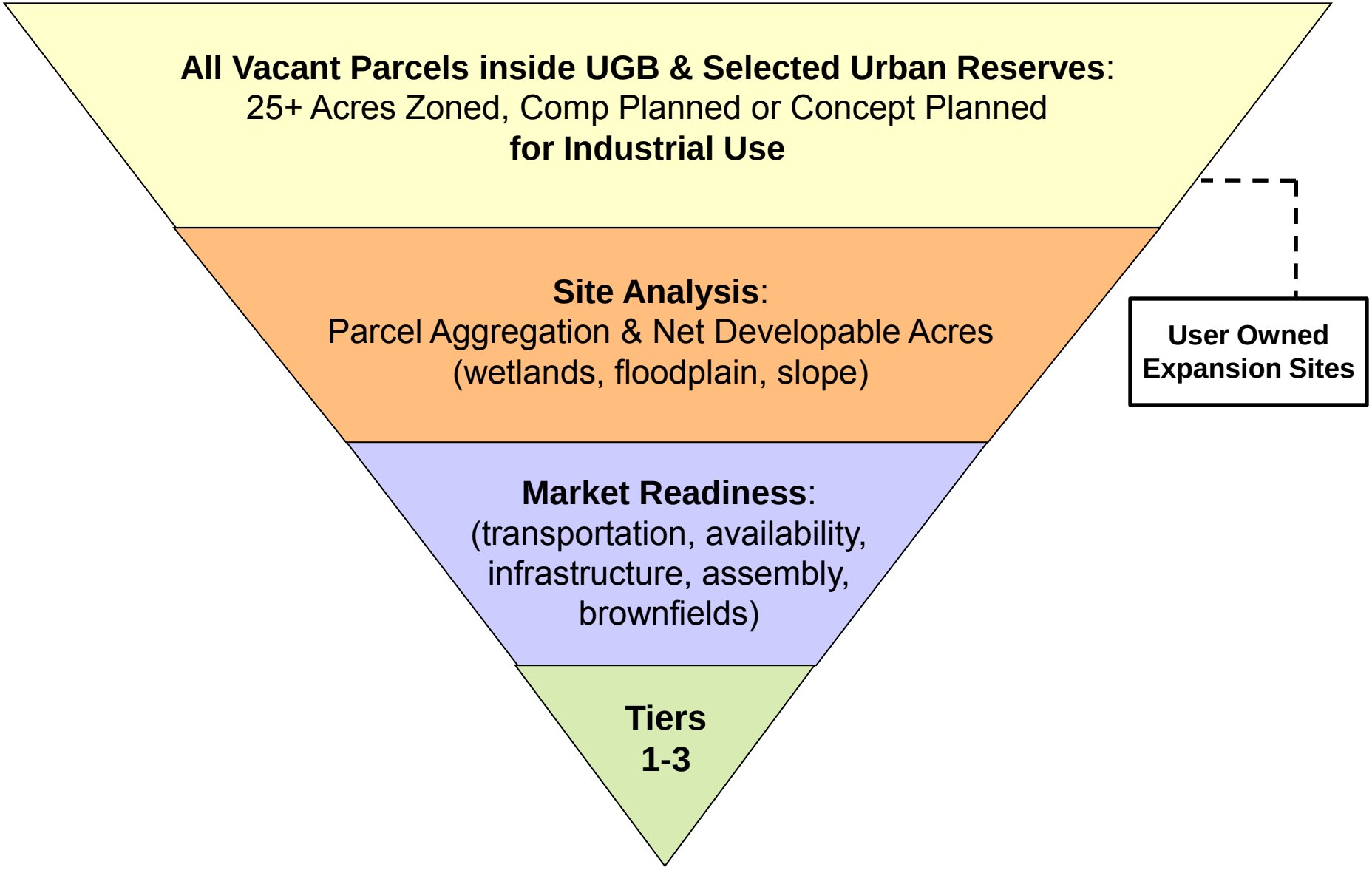
Phase 1

Inventory All Potential Sites
Categorize by Market Readiness (Tier 1-3)
Identify Development Constraints (high level)

Phase 2

Detailed Analysis of 5-10 Sites in Tier 2 or 3
Identify Investments and Actions Needed to Move to Development Ready
Economic Impact of Investments

Phase 1 Process



Development and Marketability Constraints

Identified Barriers to Development

BARRIER	EXAMPLE
Natural Constraints	Wetlands; Flood Plain; Slope
Brownfields	On-site contamination; Superfund
Infrastructure	Availability of sewer/water
Transportation	Access; Congestion
Local Approvals	UGB; annexation; zoning
Use Limitations	Aviation/Marine overlays

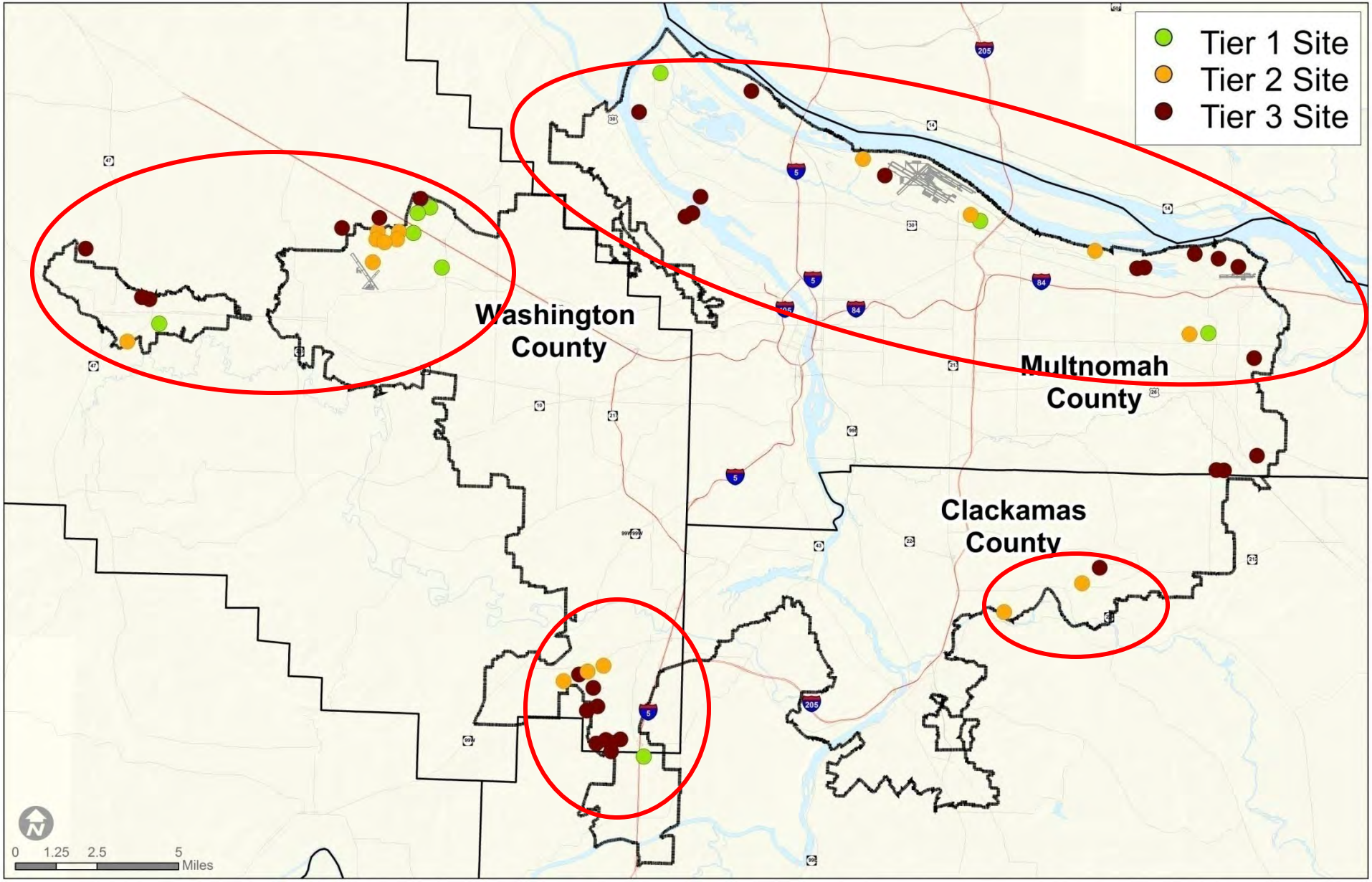
Identified Barriers to Sale

BARRIER	EXAMPLE
Not for sale	Not interested in transacting
Assembly required	Multiple property owners
Non-industrial pricing	Priced too high
Brownfield	Clean up liability

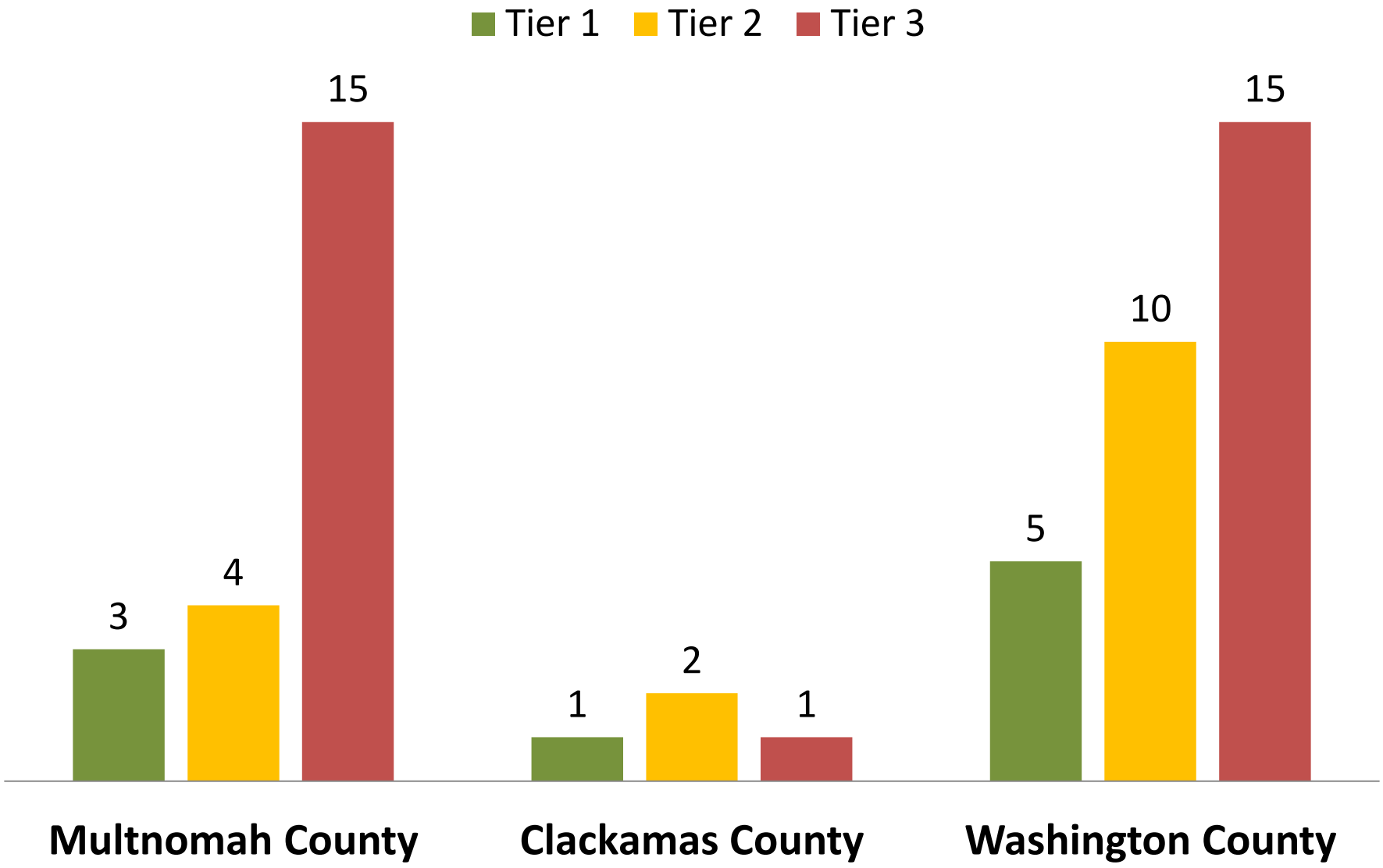
Key Findings

- 56 industrial sites identified with 25+ net developable acres
  - 9 Tier 1 sites (180 days to market)
  - 16 Tier 2 sites (7 to 30 months to market)
  - 31 Tier 3 sites (>30 months to market)

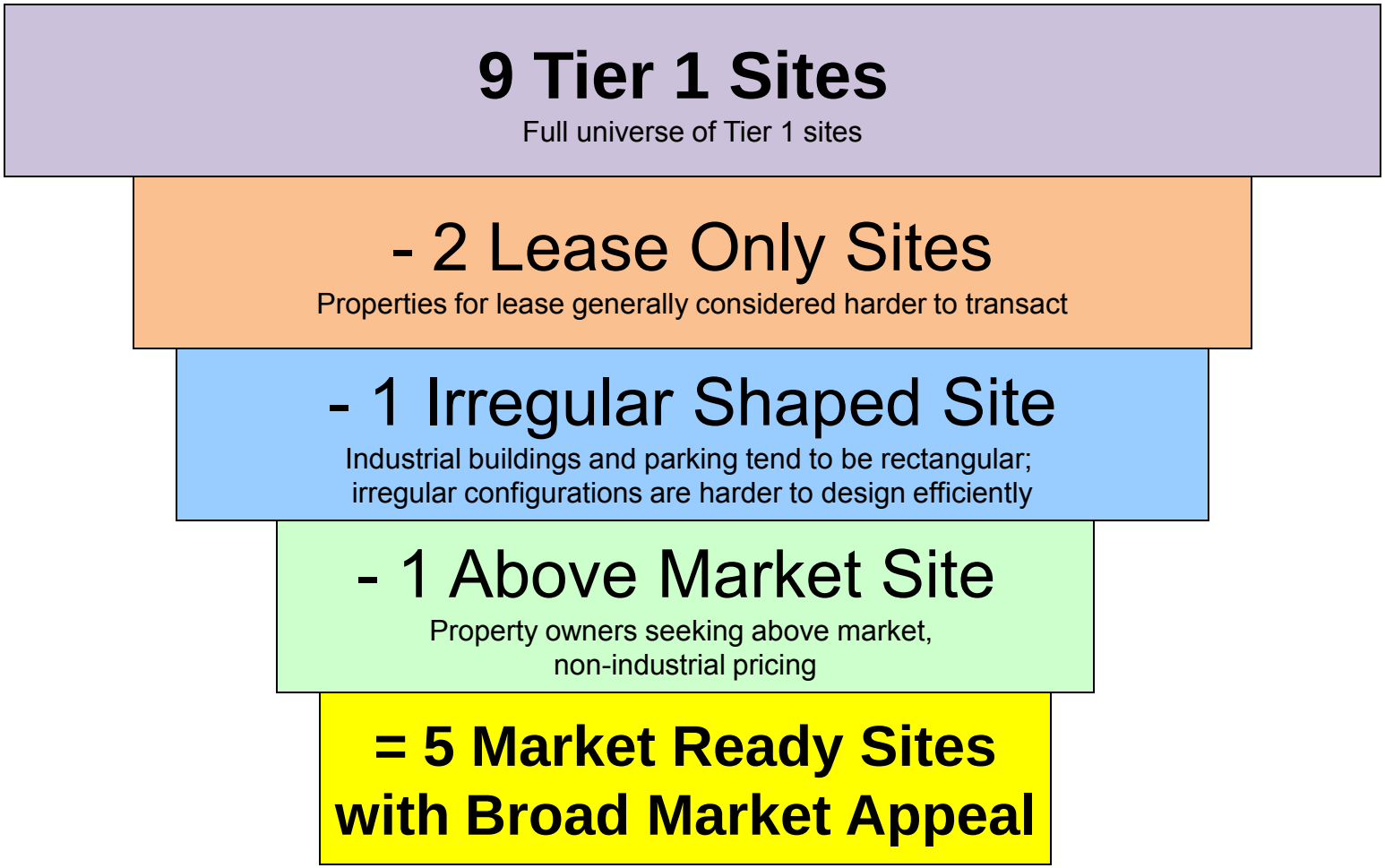
- 23 additional user owned industrial sites held for future expansion
  - Land banked, not available to market


Tier 1 Site
Tier 2 Site
Tier 3 Site
Washington County
Multnomah County
Clackamas County
0 1.25 2.5 5
Miles

Regional Site Distribution



5 Tier 1 Sites Broad Market Appeal



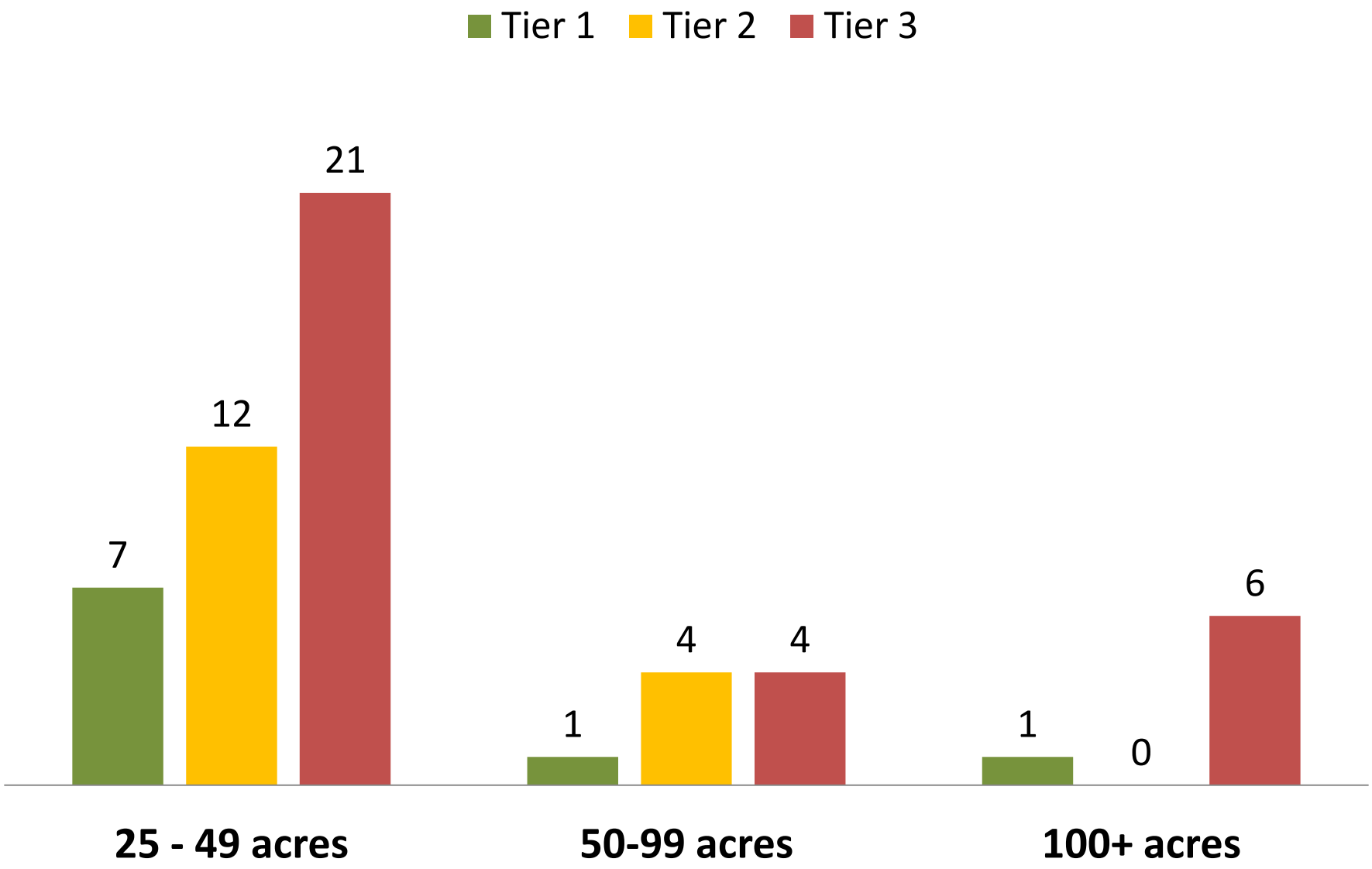
Tier 2 and 3 Potential Development Constraints

	TIER 2	TIER 3
BROWNFIELD / CLEANUP	1	7
NATURAL RESOURCES	4	9
INFRASTRUCTURE	5	14
TRANSPORTATION	6	12
LAND ASSEMBLY	4	10
LEGISLATIVE ACTIONS	5	15
NOT WILLING TO TRANSACT	0	18

Action Needed for Tier 2 & 3 Sites

- 14 sites require land assembly
  - 4 Tier 2 & 10 Tier 3 sites
  - Multiple owners
- 15 sites require legislative action
  - Tier 2: 5 sites require annexation
  - Tier 3: 11 sites require annexation; 4 sites in urban reserves
    - 1 in recent 2011 UGB expansion, 3 for 2016 periodic review
- 8 sites identified as brownfields
  - 3 in Lower Willamette Superfund cleanup area

Distribution of Sites by Acreage



Demand for Large Sites

- **Public:** 25% of Business Oregon leads seeking more than 25+ acres
  - Every major recruitment category had at least one opportunity needing more than 25 acres

- **Private:** Survey of 6 Metro brokers shows 11 leads a year for sites greater than 50 acres

- Consistent interest in 50+ and 100+ acres based on public and private data, even during current economic downturn

Traded Sector Industry

Acreage Requirements for Majority of Leads

	Regional/ National Scaled Clean Tech	Globally Scaled Clean Tech	Heavy Ind./ Mfrg	General Mfrg	High Tech Mfrg/ Campus Industrial	Warehouse / Dist.	Regional Dist. Centers
Competitive Acreage Required	50 acres	100 acres	25 acres	10 acres	25 acres	25 acres	80 acres

Diversity of site sizes is critical to traded sector industries and competitiveness

Conclusions

- **Tier 1:** Few market ready sites and choice for traded-sector opportunities
    - 9 sites shovel ready within 6 months - 5 with broad marketability
- **Tier 2:** Modest supply of mid-term sites requiring investment and policy actions to bring to market
    - 16 sites, 4 require assembly
- **Tier 3:** Multiple challenges and significant investment and time to market required
    - 31 potential sites, 10 require assembly

Conclusions – continued

- Uneven geographic distribution of all sites
- Few 50+ and 100+ acre sites
- Broad range of potential development constraints for Tier 2 and 3 sites

Key Takeaways

- Aggregate large lot, industrial land supply within the Metro region is constrained on a number of fronts
- Investments and policy actions are required to move Tier 2 and 3 sites to market readiness
- Diversity of site sizes is critical for competitiveness
- Market choice for traded sector industries is limited for 50+ acre sites

Next Steps: Nov. – Feb.

- Phase 1 report – Nov./Dec.
- Phase 2 – Nov.-Jan.
  - Conduct more detailed assessment of 5-10 diverse sites (size, location, barriers) for large lot users
  - Includes development scenarios, investments required, and economic benefit of development
  - Independent, market-oriented analytic approach
- Final report – Feb.

Project Contact Information

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Questions and Answers

PROPOSED Phase 2 Sites	Location	Tier / Size Net acres	Ownership	Traded-Sector Industry	Development Constraint
13. ICDC LLC	Portland Mult. Co.	Tier 2 26.5+ acres	Private	D, **H**	Natural Resources; Infrastructure
29. Clackamas Co. Dev.	Clackamas Clack. Co.	Tier 2 40 acres	Public	C, **D**, H	Natural Resources
55/56. Spokane Humane Society& East Evergreen	Hillsboro Wash. Co.	Tier 2 116 comb. ac.	Private	**B**, D, F A, F	Nat Res; Infrastructure; Transportation; Assembly
62. Rock Creek	Happy Valley Clack. Co.	Tier 2 34 acres	Private	D, **F**	Infrastructure; Assembly
19. Troutdale Reynolds Phase 2	Troutdale Mult. Co.	Tier 2 80 acres	Public	A, D, H, **I**	Infrastructure; Transp; Nat Res; Brownfield
2. Time Oil Co.	Portland Mult. Co.	Tier 3 25+ acres	Private	**C**, D, H, **Marine**	Nat Res; Transp; Brownfield
15/16. BT Property (UPS) & Michael Cereghino	Gresham Mult. Co.	Tier 3 74.45 comb. ac.	Private	D, F, **H**	Nat Res; Transp; Not Willing to Transact; Assembly
24. Jean Johnson	Gresham Mult. Co.	Tier 3 33.2 acres	Private	D, **F**	Legislative Action; Infra
33. Coffee Creek site 1	Wilsonville Wash. Co.	Tier 3 80.3 comb. ac.	Private	C, **D**, F, H, I	Transp; Infrastructure; Assembly
37. Orr Family Farm	Sherwood Wash. Co.	Tier 3 42.8 acres	Private	**D**	Leg Action; Infra; Transp; Not Willing to Transact
104. Hillsboro Urban Reserves	Hillsboro Wash. Co.	Tier 3 309 comb. ac.	Private	**A**-2 50 ac, **B**–1 100 ac, **F**- 25 ac	Nat Res; Infras; Transp; Assembly; Leg Action

Traded-Industry Key

based on Business Oregon Industry Siting Requirements

A = Regionally to nationally scaled clean-tech manufacturer

B = Globally scaled clean technology campus

C = Heavy industrial/manufacturing

D = General manufacturing

F = High-tech manufacturing or campus industrial

G = Regional (multi-state) distribution center

H = Warehouse/distribution

I = Portland regional distribution center

Number of Net Acres

	MULTNOMAH		WASHINGTON		CLACKAMAS		TOTAL
	ACRES	%	ACRES	%	ACRES	%	ACRES
Tier 1	199	46%	200	47%	32	7%	430
Tier 2	121	18%	480	71%	74	11%	675
Tier 3	1,093	46%	1,245	53%	25	1%	2,363
Total	**1,413**	**41%**	**1,925**	**55%**	**131**	**4%**	**3,468**

Note: This acreage does not include user owned sites held for future expansion.

Sites by Location with Metro Region

	MULTNOMAH SITES	WASHINGTON SITES	CLACKAMAS SITES	TOTAL	%
Tier 1	3	5	1	9	16%
Tier 2	4	10	2	16	29%
Tier 3	15	15	1	31	55%
Total	22	30	4	56	100%

100+ Acre Site Distribution

		TIER 1	TIER 2	TIER 3	TOTALS
Multnomah	PORTLAND			2	2
	GRESHAM	1			1
	FAIRVIEW				
	TROUTDALE				
Clackamas	HAPPY VALLEY				
	CLACKAMAS COUNTY				
Washington	WILSONVILLE				
	TUALATIN			1	1
	SHERWOOD				
	HILLSBORO			2	2
	FOREST GROVE			1	1
	TOTAL	1	0	6	7

50-99 Acre Site Distribution

		TIER 1	TIER 2	TIER 3	TOTALS
Multnomah	PORTLAND		1		1
	GRESHAM		1		1
	FAIRVIEW				
	TROUTDALE			1	1
Clackamas	HAPPY VALLEY				
	CLACKAMAS COUNTY				
Washington	WILSONVILLE			1	1
	TUALATIN			1	1
	SHERWOOD				
	HILLSBORO	1	2		3
	FOREST GROVE			1	1
	TOTAL	1	4	4	9

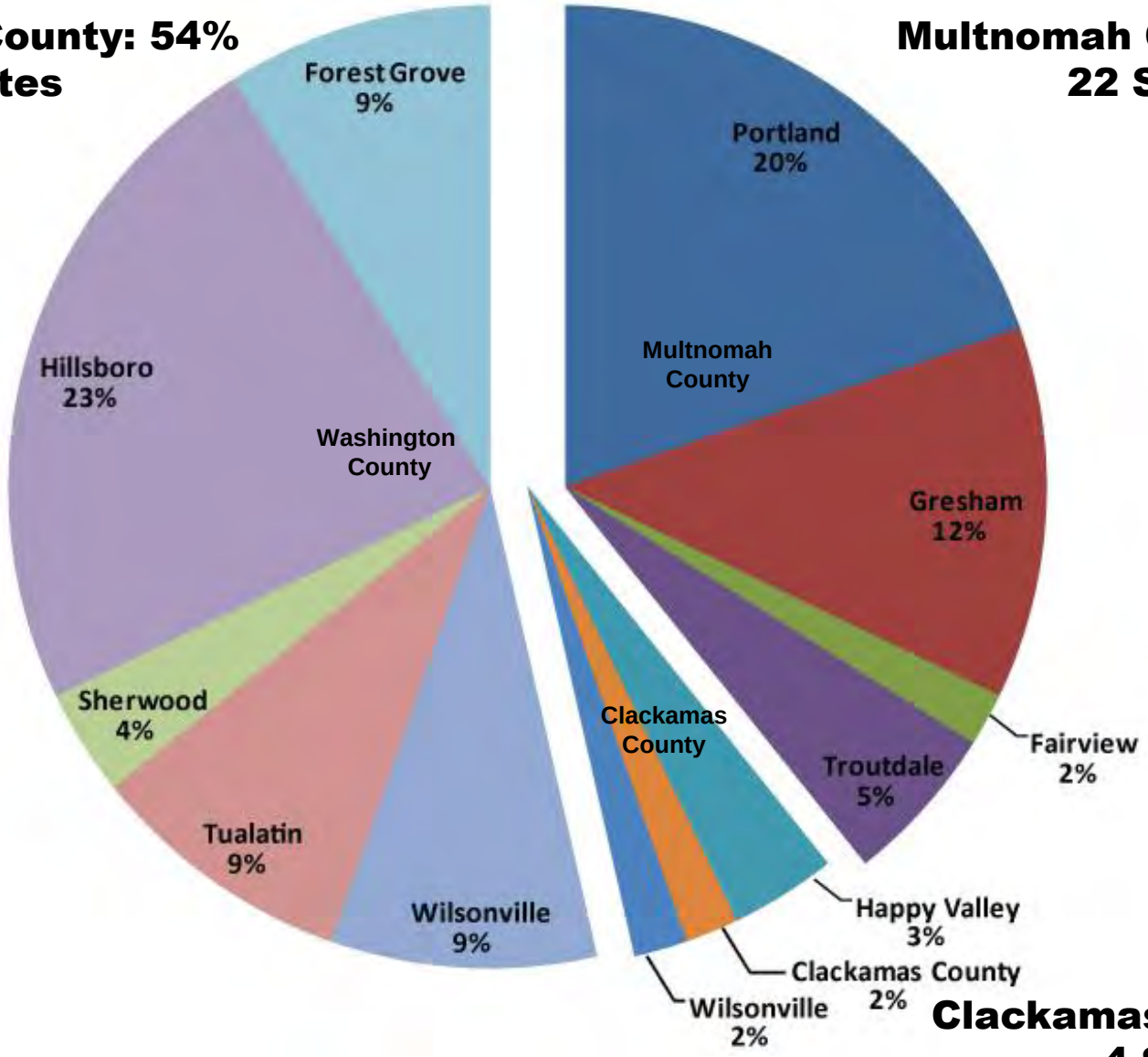
25-49 Acre Site Distribution

		TIER 1	TIER 2	TIER 3	TOTALS
Multnomah	PORTLAND	2	2	4	8
	GRESHAM			5	5
	FAIRVIEW			1	1
	TROUTDALE			2	2
Clackamas	HAPPY VALLEY		1	1	2
	CLACKAMAS COUNTY		1		1
Washington	WILSONVILLE	1		4	5
	TUALATIN		2	1	3
	SHERWOOD		1	1	2
	HILLSBORO	3	4	1	8
	FOREST GROVE	1	1	1	3
	TOTAL	7	12	21	40

Regional Site Distribution

Washington County: 54%
30 Sites

Multnomah County: 39%
22 Sites

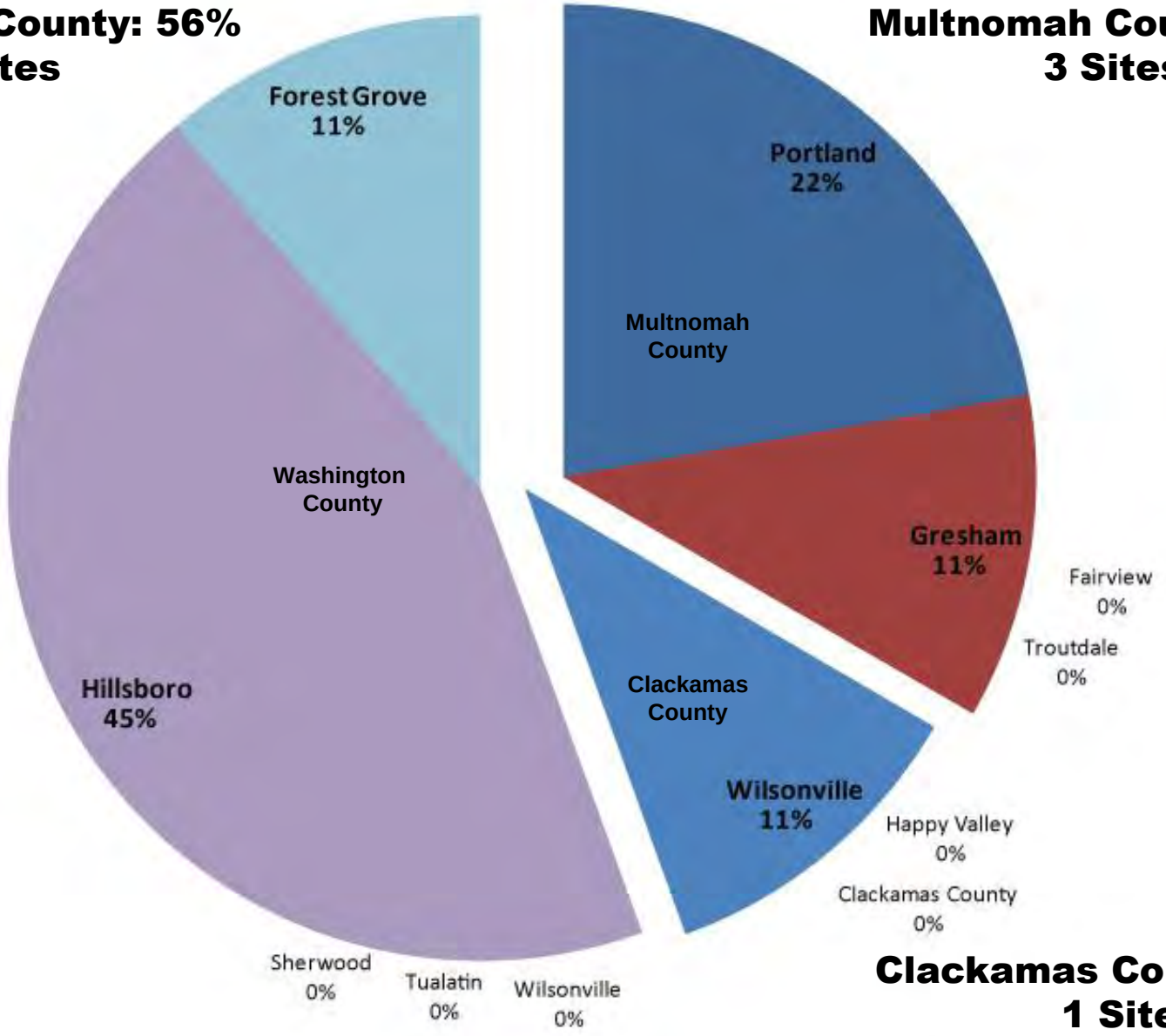


Clackamas County: 7%
4 Sites

Tier 1 Site Distribution

Washington County: 56%
5 Sites

Multnomah County: 33%
3 Sites

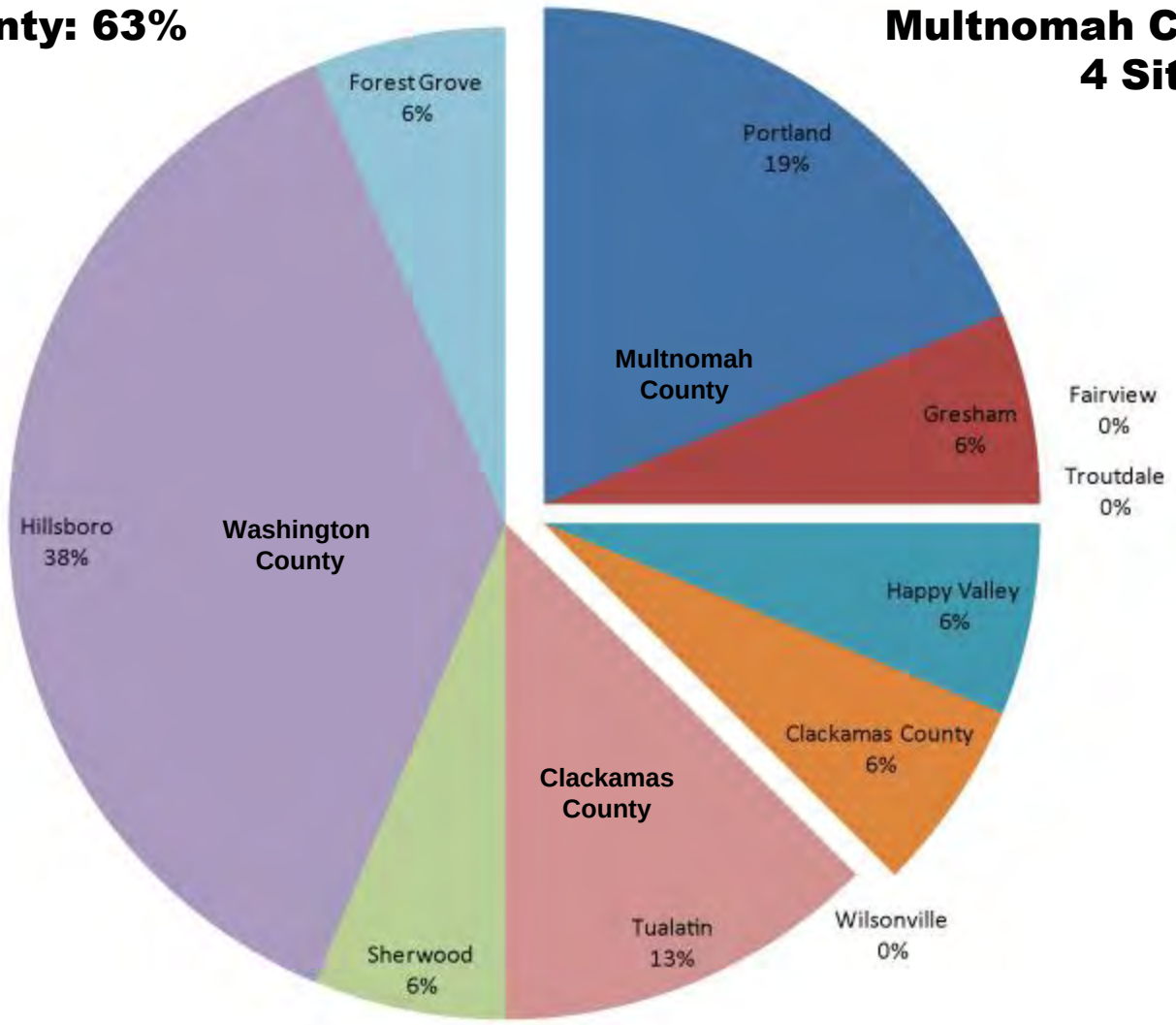


Clackamas County: 11%
1 Site

Tier 2 Site Distribution

Washington County: 63%
10 Sites

Multnomah County: 25%
4 Sites

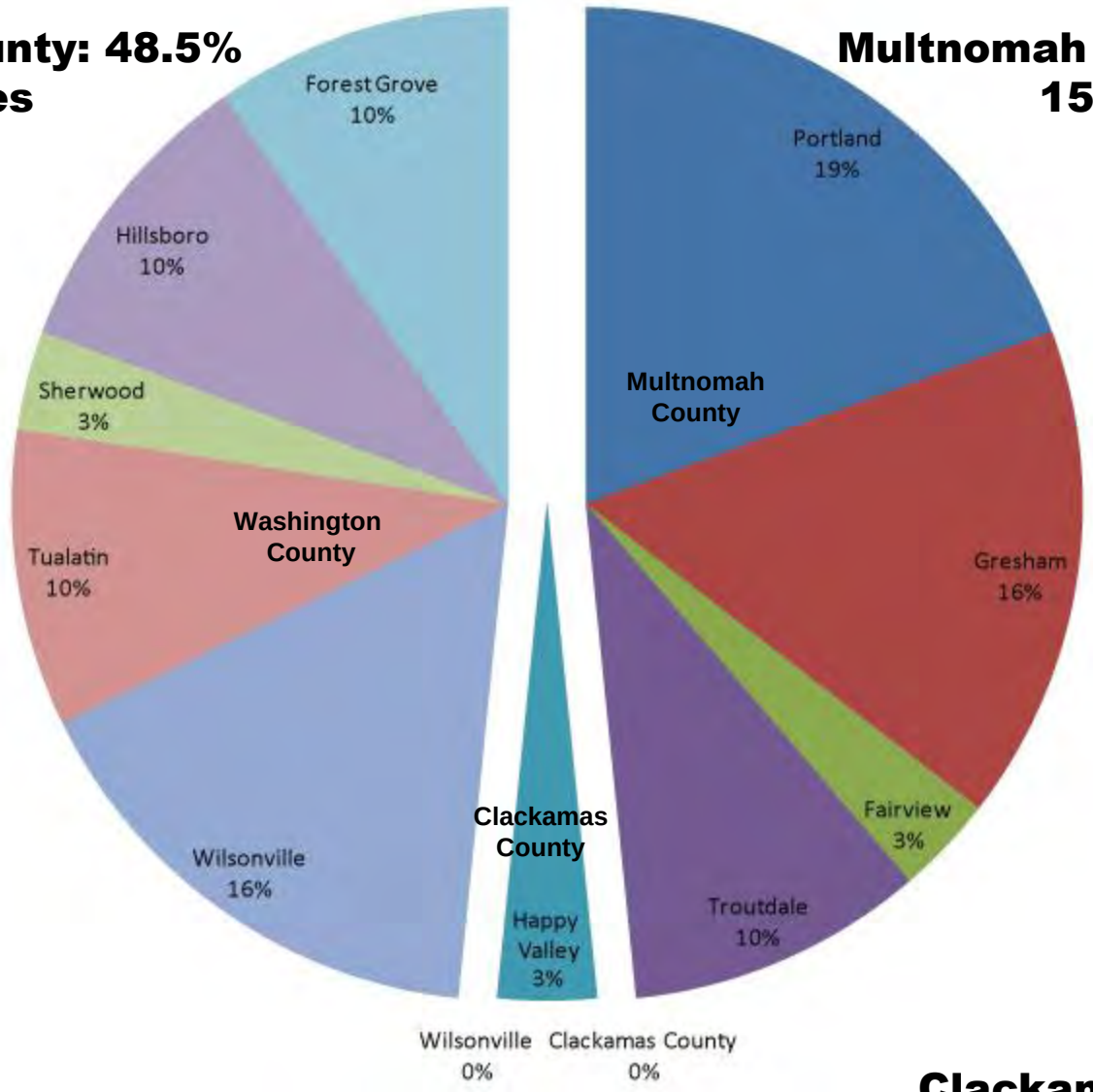


Clackamas County: 12%
2 Site

Tier 3 Site Distribution

Washington County: 48.5%
15 Sites

Multnomah County: 48.5%
15 Sites



Clackamas County: 3%
1 Site

www.oregonmetro.gov/climatescenarios

Climate Smart Communities Scenarios Project

Metro Technical Advisory Committee

November 16, 2011

Phase 1 purpose

- How far do current plans and policies get us?
- What is the relative GHG emissions reduction potential of different policies?
- What are our choices?

Not to choose a preferred alternative

2035 GHG Targets for Oregon MPOs

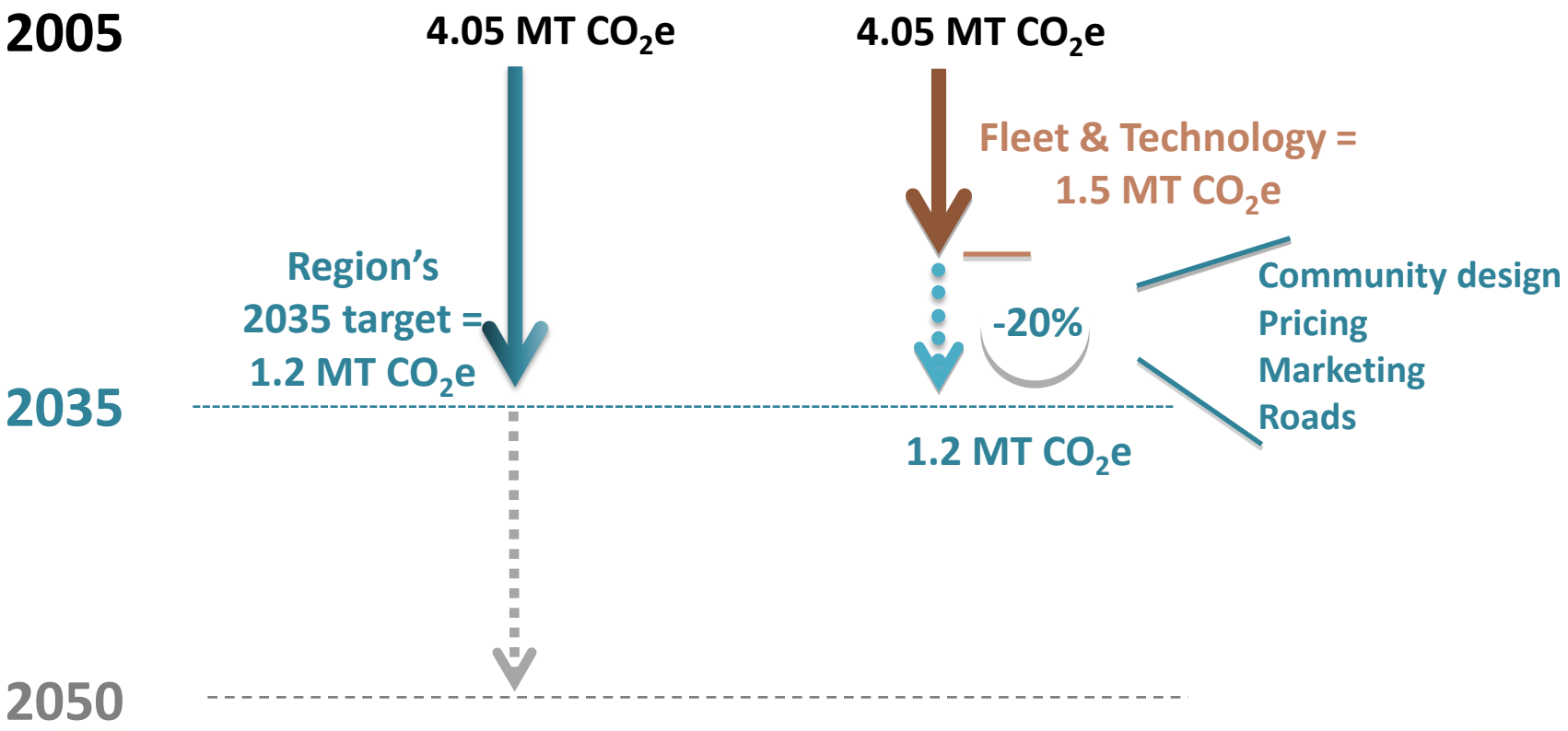
per capita light vehicle GHG emissions reduction below 2005 levels

Metropolitan Area	Adopted Target
Portland Metro**	20%
Eugene-Springfield*	20%
Salem-Keizer	17%
Rogue Valley	19%
Bend	18%
Corvallis	21%

*Required Scenario Planning
** Required Scenario Planning & Adoption

Metro

Region's 2035 GHG emissions reduction target (in per capita terms)



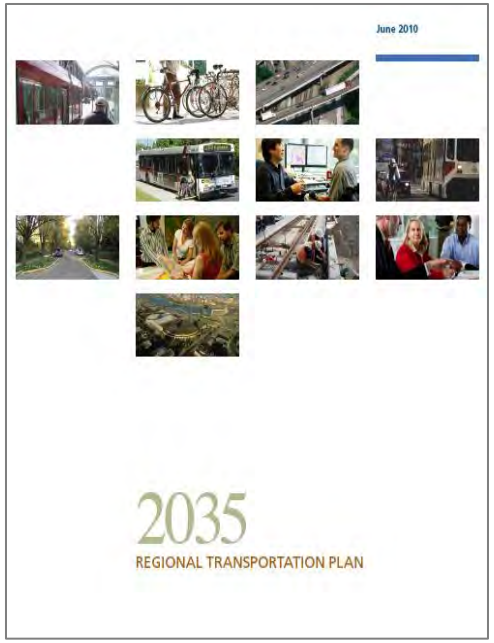
Building blocks for regional scenarios

Testing bundles of plausible strategies

Metro

Level 1 assumptions = current plans and policies…

- Adopted 2035 Regional Transportation Plan
  - Transit service level
  - Freeway widening and management
  - Arterial connectivity and widening
  - 2% regional bike mode share
- Locally adopted land use plans
- Some urban reserves anticipated to be developed by 2035



…Level 1 assumptions = current plans and policies

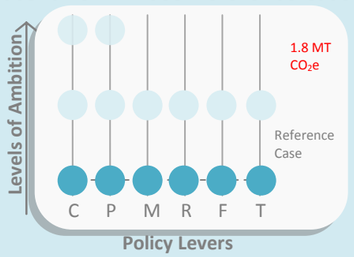
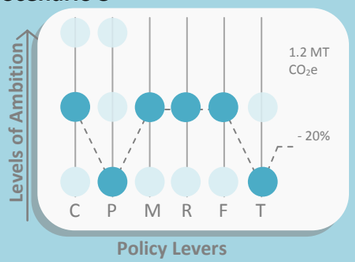
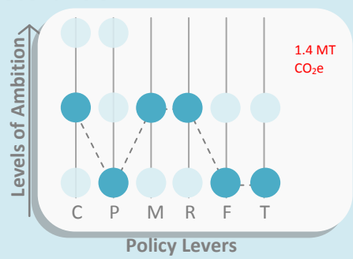
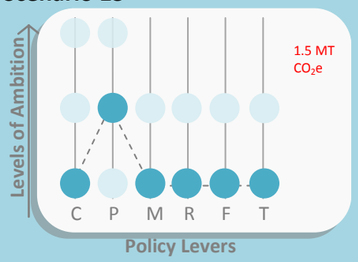
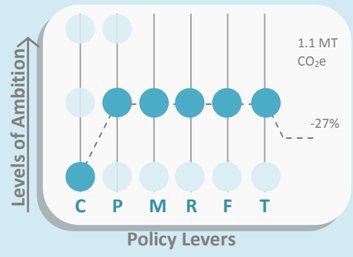
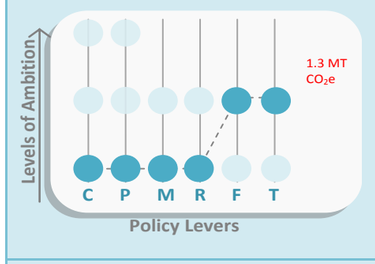
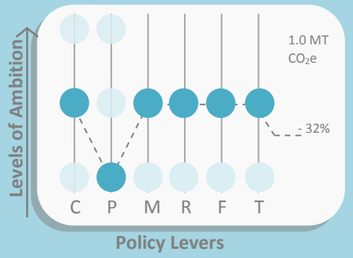
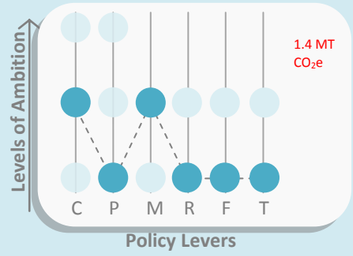
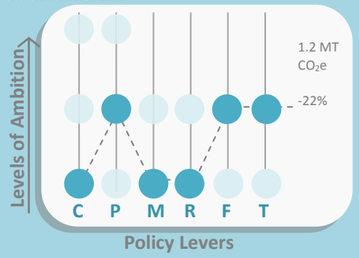
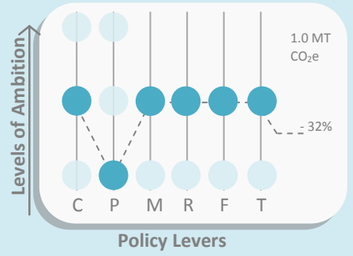
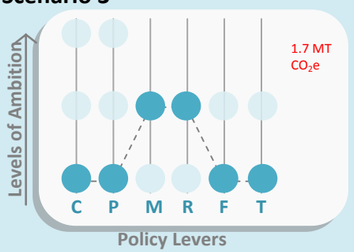
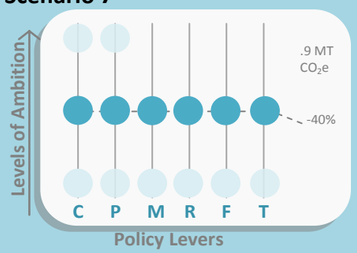
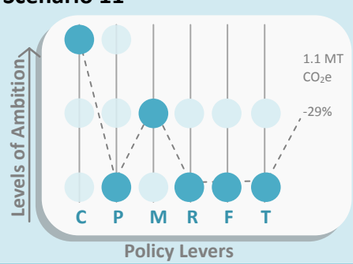
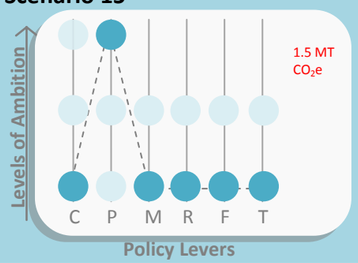
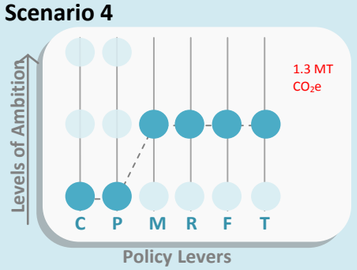
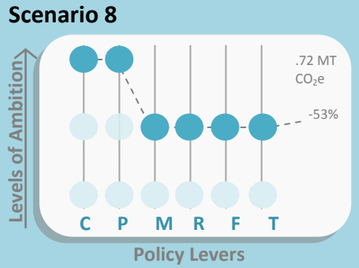
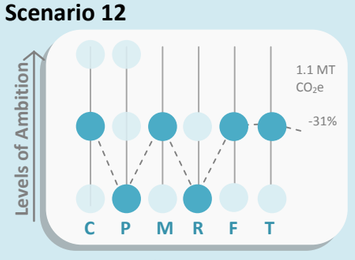
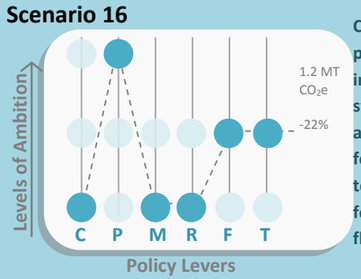
- Gas tax and parking fees at current levels
- 9% of households participate in individualized marketing
- 20% of workforce participates in employer-based commute programs
- Fleet mix same as today
- Achieve federal CAFÉ standard of 50 MPG
- Electric vehicle share grows to 4%

Most ambitious community design policies resulted in greatest reductions

Policy Lever and Level		Estimated percent reduction (from 2035 Reference Case)
	Community Design 2	-18%
	Community Design 3	-36%
	Pricing 2	-13%
	Pricing 3	-14%
	Marketing and incentives 2	-4%
	Roads 2	-2%
	Fleet 2	-11%
	Technology 2	-14%

Discussion

- Questions?
- Other scenarios to illustrate results ?
- Policy questions to raise for MPAC and JPACT discussion?

HOW FAR DO CURRENT POLICIES GET US?	WHAT IS THE RANGE OF REDUCTIONS POSSIBLE?	WHAT IS THE EFFECT OF THE BUILT ENVIRONMENT?	WHAT IS THE EFFECT OF PRICING?	WHAT CHOICES ARE EMERGING?
Scenario 1 – 2035 Reference Case  Current policies	**Scenario 5**  Boost all policies but pricing and tech	**Scenario 9**  Current policies & boost community design and system efficiency	**Scenario 13**  Current policies & increased state gas tax as a road use fee	**Scenario 17**  Boost all policies but community design
Scenario 2  Current policies & boost fleet and tech	**Scenario 6**  Boost all policies but pricing	**Scenario 10**  Current policies & boost community design and marketing	**Scenario 14**  Current policies, increased state gas tax as a road use fee & boost fleet and tech	**Scenario 18**  Boost all policies but pricing
Scenario 3  Current policies & boost system efficiency	**Scenario 7**  Boost all policies to level 2	**Scenario 11**  Boost community design even more	**Scenario 15**  Current policies, increased state gas tax as a road use fee & add carbon fee	**Finding:** *Community design 2 and pricing 2 yield similar GHG emissions reductions, however the cost, level of effort and type of actions needed to go from C1 to C2 is not the same as going from P1 to P2.*
Scenario 4  Current policies & boost fleet, tech and system efficiency	**Scenario 8**  Boost all policies to their most ambitious levels	**Scenario 12**  Boost tech and fleet instead of community design	**Scenario 16**  Current policies, increased state gas tax as a road use fee, add $50/ ton carbon fee and boost fleet/ tech	**Finding:** *Each set of policy levers presents its own opportunities and challenges that must be considered in defining the region's preferred strategy in Phase 2 – including effects on the economy and equity, cost and cost savings, public acceptance, and actions needed to implement a particular strategy.*
Findings: *Current plans and policies are on the right track, but do not meet the target. No single policy alone meets the target. Community design and/or pricing must be more ambitious than current policies to meet target.*	**Findings:** *Ninety-three out of 144 scenarios meet or exceed the target. The reductions achieved by the 93 scenarios ranged from 20 percent to 53 percent below 2005 levels on a per capita basis.*	**Finding:** *Similar reductions are possible through the most ambitious community design and fleet/technology strategies.*	**Findings:** *A$50 per ton carbon fee has little effect, but when combined with the most ambitious technology and fleet strategies the region meets the target.*	