



LIGHT ELECTRIC VEHICLES AND URBAN MOBILITY

EVRoadmap 9 Portland, Oregon – July 21, 2016

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US Transport Sector Impacts



Safety

- 32,788 fatalities in 2010 (-3% from 2009)
- 1.09 fatalities per 100 MVMT (VMT +0.7% in 2010)
- 2.2 M injuries in 2009
- 5.3 M crashes in 2011
- \$230 B total cost (including medical)
- Leading cause of death for ages 4 to 34

Accessibility, Reliability and Mobility

- 4.8B hours travel delay (34 hours/auto commuter)
- \$121 billion cost of urban congestion

Household Expenses

- Second biggest monthly expense, after housing

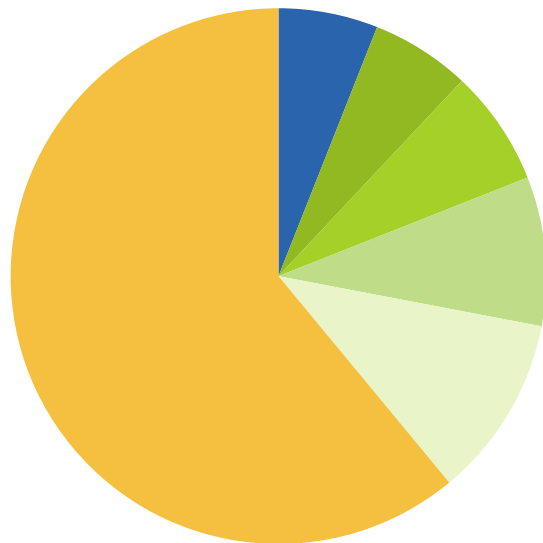
Environmental

- 28% of GHG emissions (78% CO, 58% NO_x, 36% VOCs)
- 29% of energy consumed (mostly petroleum)
- 70% of petroleum consumption (60% imported)
- 3.9 billion gallons of wasted fuel

Commute Mode Share for Portland

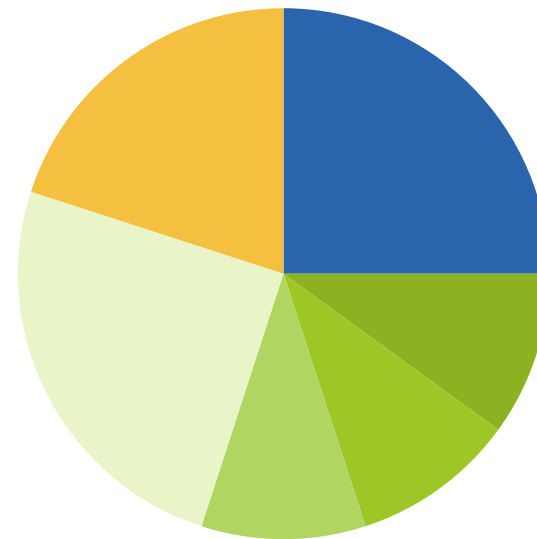
Reduce per capita daily vehicle-miles traveled (VMT) by 30 % from 2008 levels.

2012



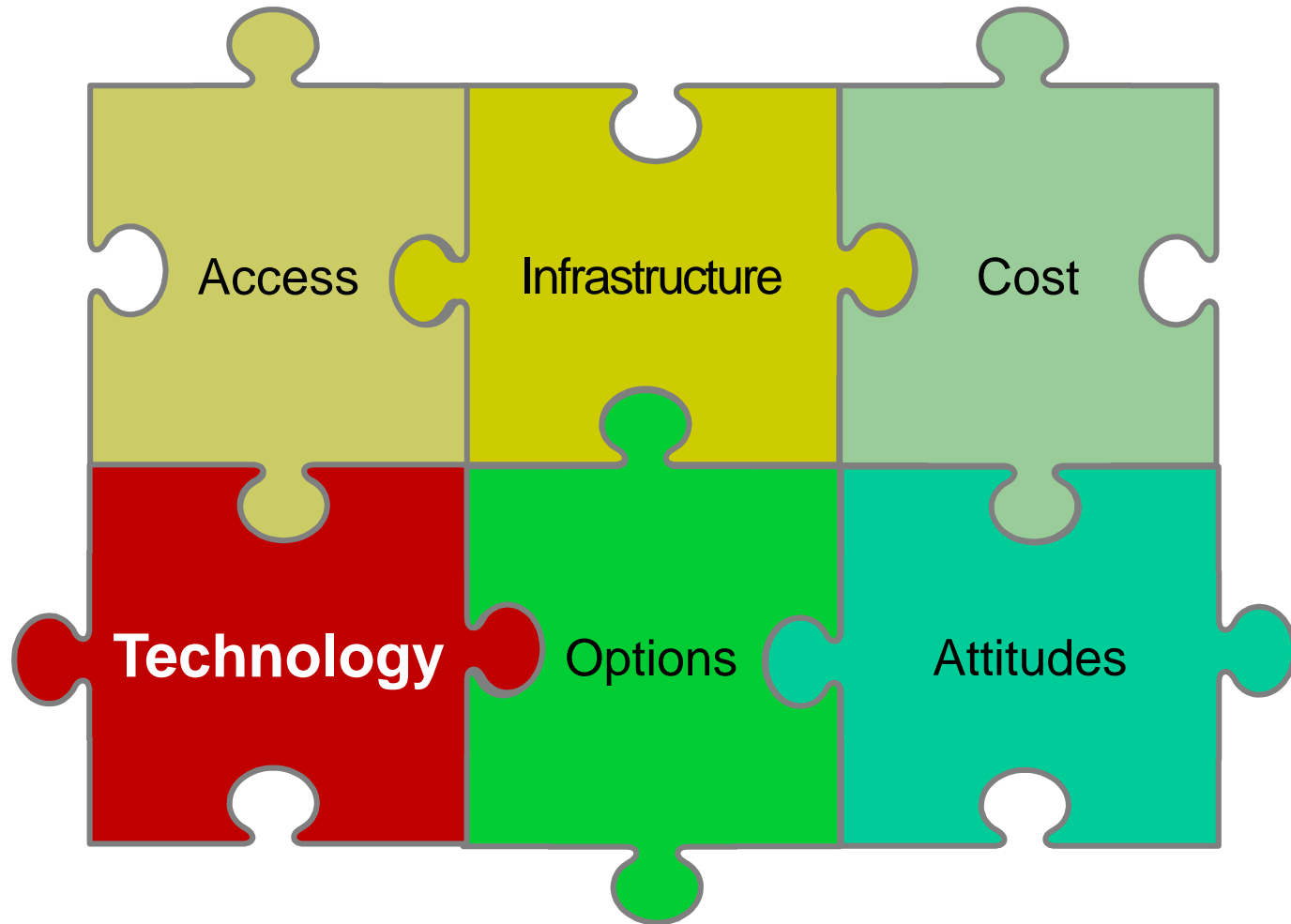
- Bike
- Walk
- Telecommute
- Carpool
- Transit
- Drive Alone

2030



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What are the critical pieces to transforming urban mobility?



Future of Mobility is E-Mobility



Come in all shapes and sizes



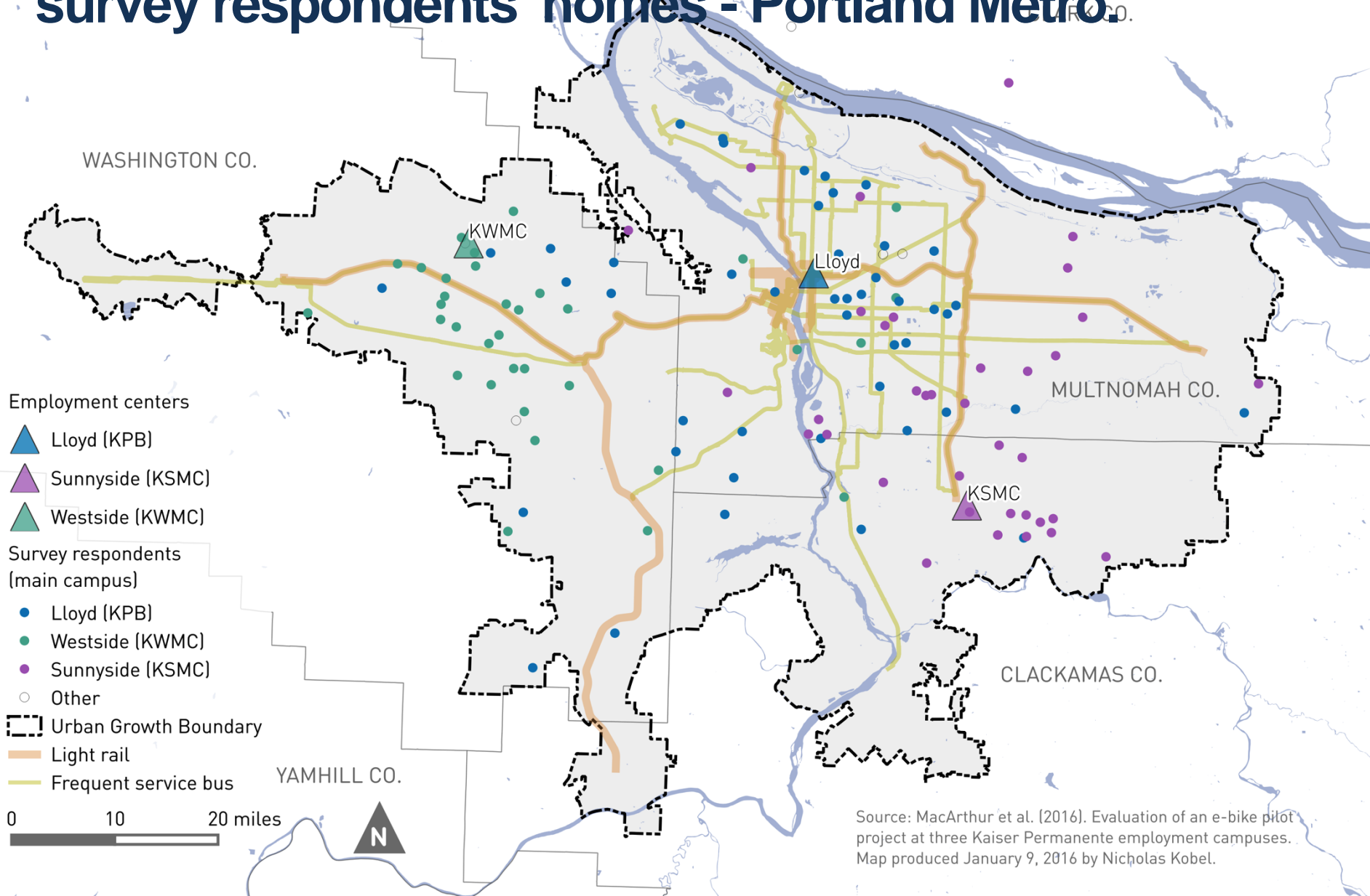
KAISER PERMANENTE E-BIKE PILOT PROJECT

Kaiser Permanente E-bike Pilot Project

- 30 Currie iZip E3 Compact
 - Top Speed: 18 mph
 - Range: 15-22 miles
 - Weight: 42 lbs.
 - Folding
- Kaiser Employees at 3 campuses (1st/last mile commuting)
- Project ran from May 2014 to Oct 2015



Map overview of employment centers, transit and survey respondents' homes - Portland Metro.



Barriers to participation in cycling cited by respondents

	Standard bicycle			E-bike	
	(A)	(B)	(C)	(D)	(E)
Sample size (n)	56	31	87	80	86
Weather conditions	45%	39%	74%	59%	56%
Trip logistics, preparation and/or time constraints	43%	61%	18%	11%	19%
My destination is too far	45%	10%	44%	15%	23%
The bike is uncomfortable or causes pain	2%	0%	0%	8%	19%
I can't carry the things I need	0%	0%	45%	19%	21%
I am concerned for my safety	5%	3%	0%	19%	14%
I do not have access to a bicycle <i>OR</i> there was an issue with my e-bike	61%	29%	14%	6%	5%
There is no place to securely store my bicycle	0%	0%	2%	5%	17%
I don't like to arrive sweaty/no showers at work	4%	0%	52%	18%	12%
I am unable to bike for health concerns or am physically unable	23%	32%	3%	30%	41%
Transit connections are not easy or convenient	0%	0%	0%	8%	9%
"Laziness" (self-reported)	2%	10%	21%	1%	0%
Hills	4%	0%	41%	1%	0%
Other	4%	6%	3%	1%	5%

(A): **Pre-use:** Why did you stop biking for transportation to work?

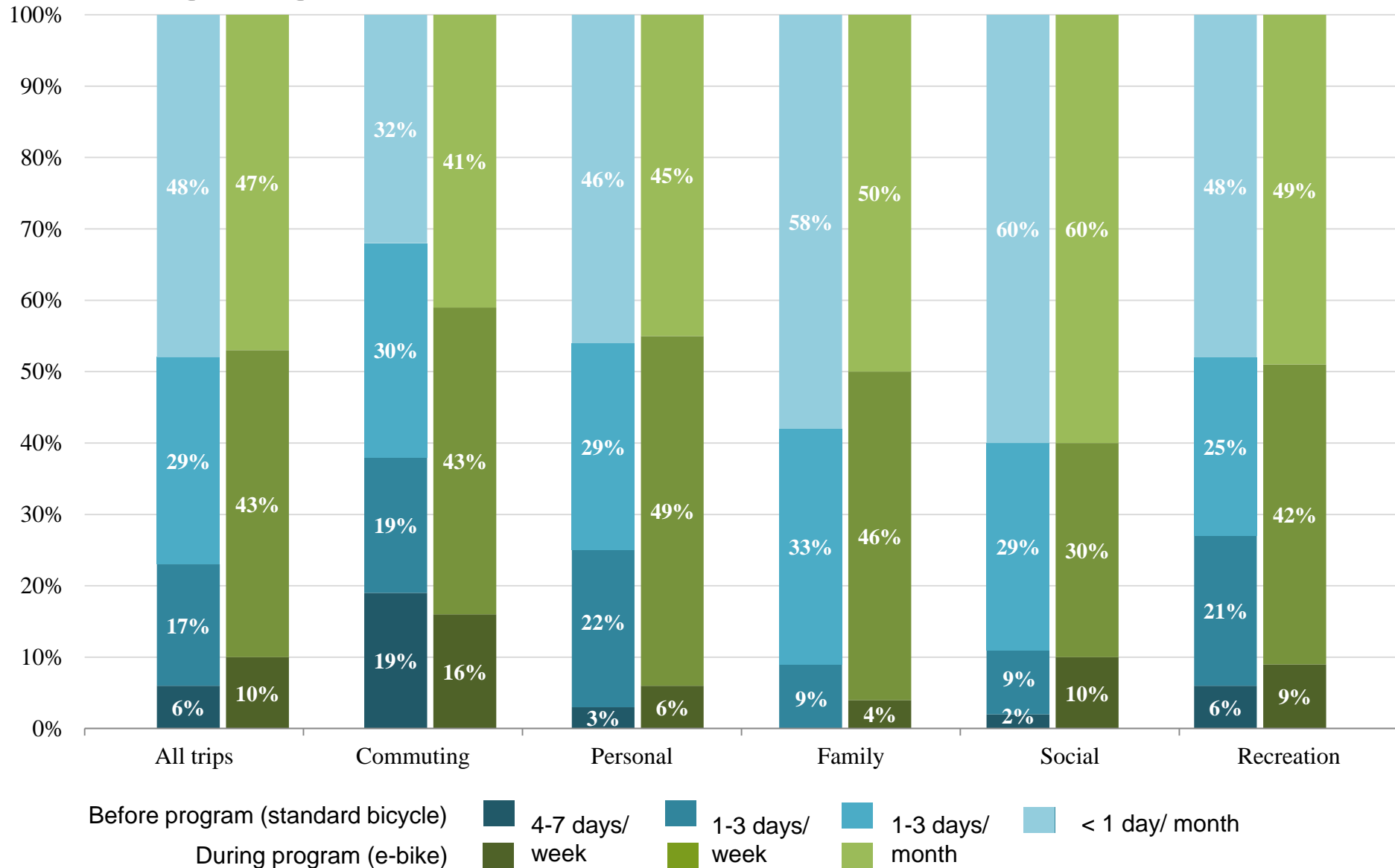
(B): **Pre-use:** Why did you stop biking for recreation?

(C): **Pre-use:** What are the main factors keeping you from biking more often?

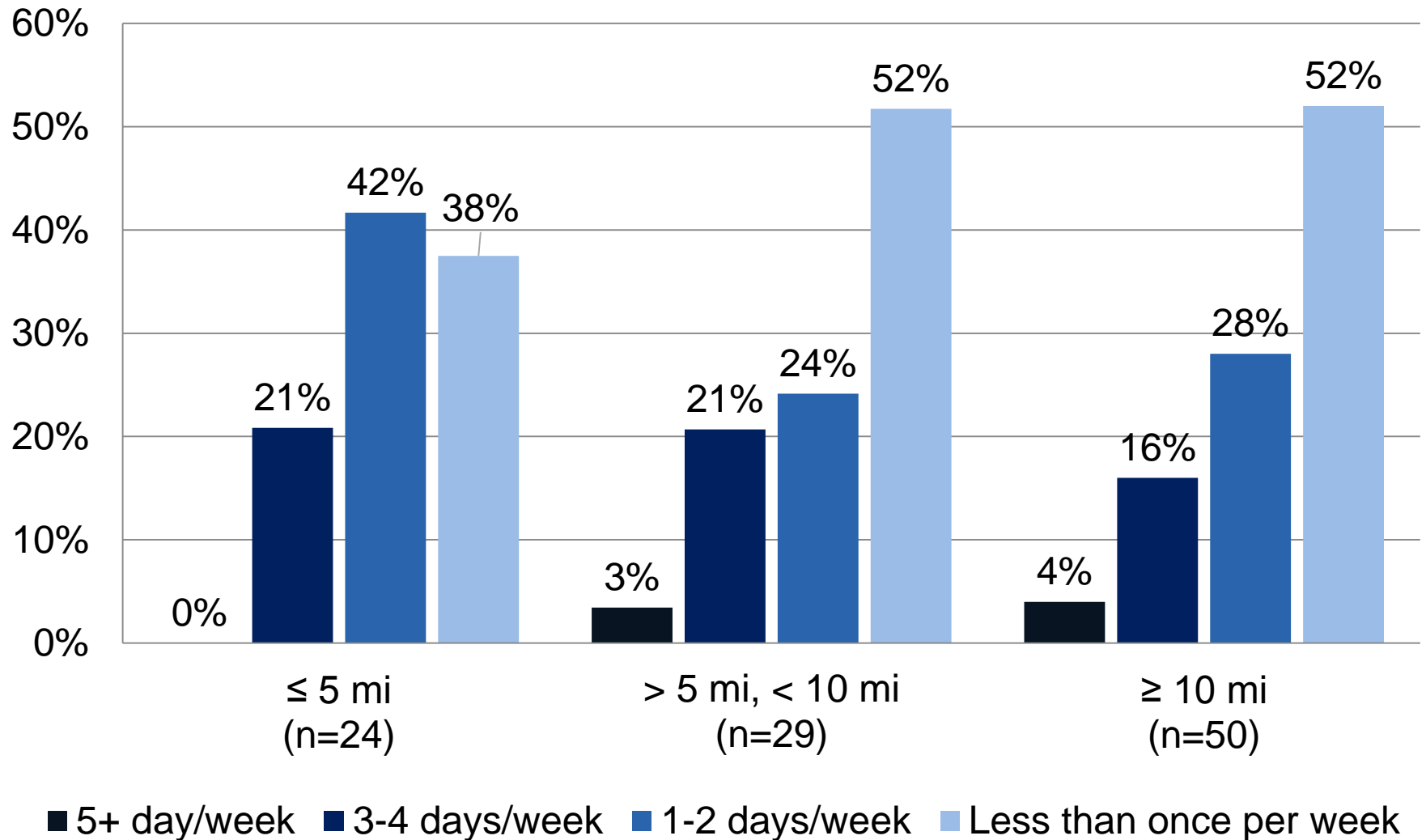
(D): **Mid-use:** If you would like to use the e-bike to commute to work more often, what prevents you from doing so?

(E): **Post-use:** If you weren't able to use the e-bike as often as you would have liked, what prevented you from doing so?

Frequency of bicycle usage by trip purpose, before and during program



Reported usage of e-bike (trip frequency) for commuting by distance from work.



Main Conclusions

- E-bikes reduce some barriers to participation in cycling
- E-bikes may help people be more comfortable on bicycles
- E-bikes encourage more trips by bicycle

