U.S. Department of Transportation
Federal Highway Administration

Impacts of City-Level Parking Cash-out and Commuter Benefits Ordinances

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What is Parking Cash-Out?

- Employers that **subsidize parking** offer commuters the option to **take a benefit of equivalent monetary value** instead of the parking subsidy
- The benefit could pay for tax-free commute alternatives (public transportation, vanpool) and the employee would pocket the rest as taxable cash
- Cash-out for employees using other forms of sustainable transportation (e.g., carpooling, bicycling, walking) would receive all of it as taxable cash

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What Are the Impacts of Parking Cash-Out?

- **Reduction in vehicle miles traveled (VMT) and single-occupancy vehicle (SOV) travel**
  - A comprehensive analysis of eight parking cash-out programs found a 13% reduction in SOV driving, an 11% reduction in vehicle trips per commuter per day, and a 12% reduction in VMT (Shoup 1997)
- Incentivizing drivers through **re-pricing** (in this case, **shifting the subsidy to pocketed funds**) is an effective strategy for transportation demand management
  - Literature converges on a price elasticity of -0.30 for the change in vehicle travel in relation to the driving costs

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Why Parking Cash-Out?

Potential to…

- Relieve congestion
- Reduce greenhouse gas (GHG) emissions
- Improve safety
- Enhance equity

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Parking Cash-Out in Action

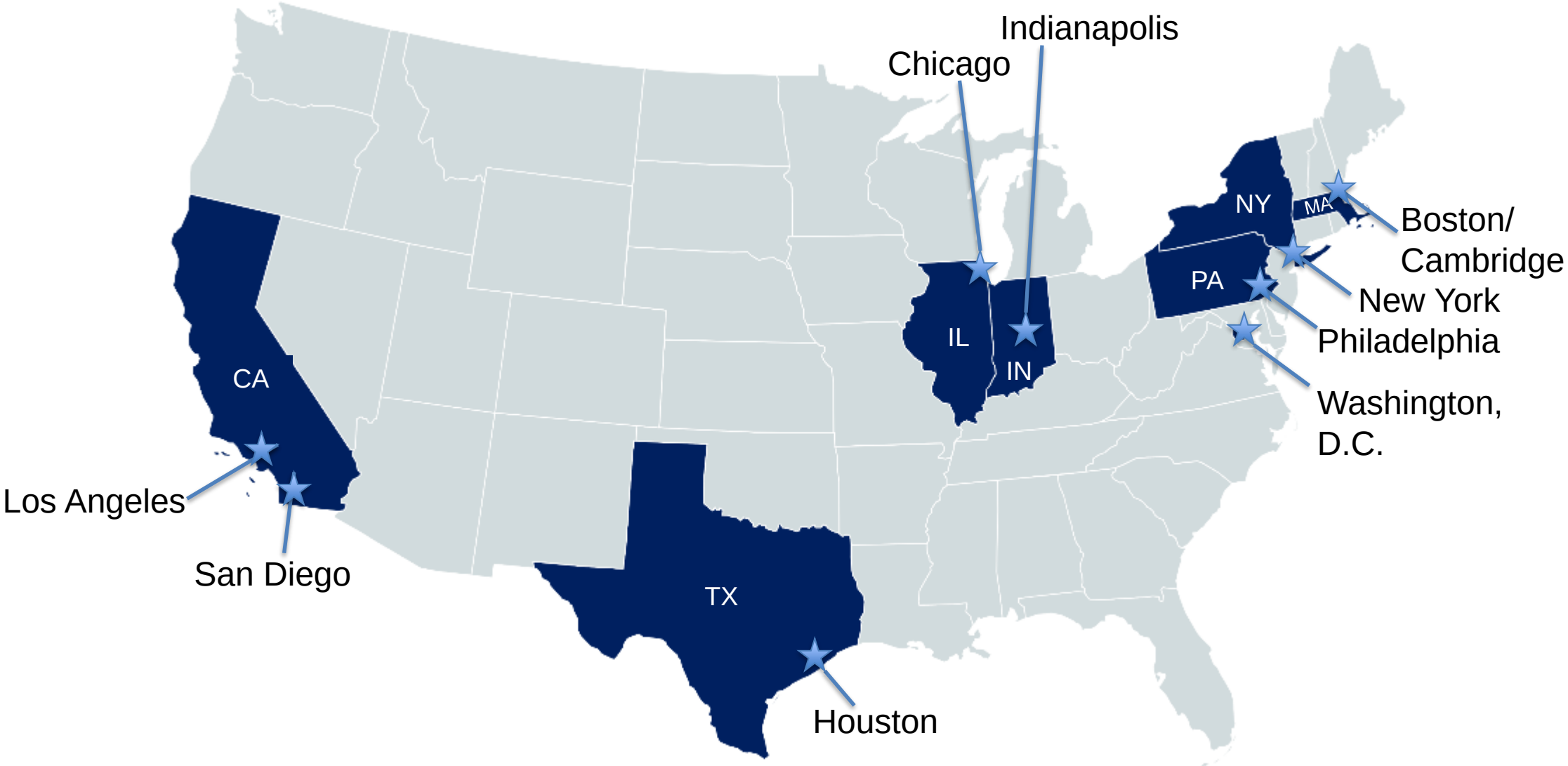
- Laws
  - California State Law
  - Rhode Island State Law
  - Washington, D.C.
- Pre-Tax Benefits
  - San Francisco, CA
  - Richmond, CA
  - Berkeley, CA
  - New York City
  - Washington, D.C.
- Employer-Provided
  - Seattle Children's Hospital
  - City of Austin, TX
  - Spectrum Health
  - Google
- Tax Credits
  - Maryland
  - Colorado
  - Delaware
  - Connecticut
  - Oregon
  - New Jersey

Photo Credit: ICF

Study Objectives

- Analyze and **evaluate** the **impact** that **city-level, parking cash-out ordinances** could have on vehicle travel (through daily VMT), as well as congestion, GHG emissions, crashes, and equity
- Provide a **resource to inform city governments** considering development of local parking cash-out ordinances
- Analysis explored results for:
  - A sample of nine cities
  - Five core policy scenarios with adjustments for telework and sample analyses looking at scenario extensions

Nine Cities Analyzed



Five Core Scenarios Analyzed

Scenarios	Affects employers offering free parking	Affects employers NOT offering free parking
Scenario 1: Monthly Parking Cash-Out	✓	
Scenario 2: Monthly Commuter Benefit	✓	
Scenario 3: Monthly Parking Cash-Out + Pre-Tax Transit Benefit for Employees without Subsidized Parking	✓ Cash-out	✓ Pre-tax transit benefit
Scenario 4: Daily Parking Cash-Out + Pre-Tax Transit Benefit for Employees without Subsidized Parking	✓ Cash-out	✓ Pre-tax transit benefit
Scenario 5: Requirement to Eliminate Subsidized Parking Benefit + Provide Universal $5 Per Day Employer-Paid Non-SOV Commute Benefit	✓ Eliminate parking benefit, add universal non-SOV benefit	✓ Eliminate parking benefit, add universal non-SOV benefit

Five Core Scenarios Analyzed *(2)*

Applies Only to Employers that Offer Subsidized Parking

1. **Monthly Parking Cash-out:** An ordinance that requires employers that offer free/subsidized parking to offer employees the option to cash-out their parking on a monthly basis.

2. **Monthly Parking Cash-out with Only an Employer-Paid Transit/Vanpool Benefit:** An ordinance that requires employers providing free/subsidized parking to offer employees a transit or vanpool benefit paid by the employer, but not in excess of the value of the parking benefit. These benefits are exempt from payroll taxes and employee income taxes, including transit and vanpool benefits up to the maximum allowed by law for each commuter.

Five Core Scenarios Analyzed *(3)*

Applies to All Employers, Benefits Vary Based on Subsidized Parking Offerings

3. **Monthly Parking Cash-Out and Pre-Tax Transit Benefit for Employees Without Subsidized Parking:** In addition to requiring that employers that subsidize parking offer a monthly parking cash-out option (same as Scenario 1), all other employers must make pre-tax transit benefits available to all of their employees. This scenario applies a requirement to all worksites—those that provide free or subsidized parking and those that currently do not.

4. **Daily Parking Cash-Out and Pre-Tax Transit Benefit for Employees Without Subsidized Parking:** This scenario is the same as Scenario 3 with the difference that the parking cash-out must be offered as a daily cash-out option, rather than monthly. In addition to requiring that employers that subsidize parking offer a daily parking cash-out option, all other employers must make pre-tax transit benefits available to all their employees. This scenario applies a requirement to all worksites— those that provide free or subsidized parking and those that currently do not.

Five Core Scenarios Analyzed *(4)*

Applies to All Employers

5. **Requirement to Eliminate Subsidized Parking Benefit + Provide Universal $5 Per Day Employer-Paid Non-SOV Commute Benefit:** An ordinance that requires employers that are offering their employees free/subsidized parking to cease offering it and for all employers to offer an employer-paid non-SOV commute benefit of $5 per commute day. The non-SOV commute benefit would be exempt from taxes to the extent allowed by law for eligible modes (e.g., for transit and vanpool expenses).

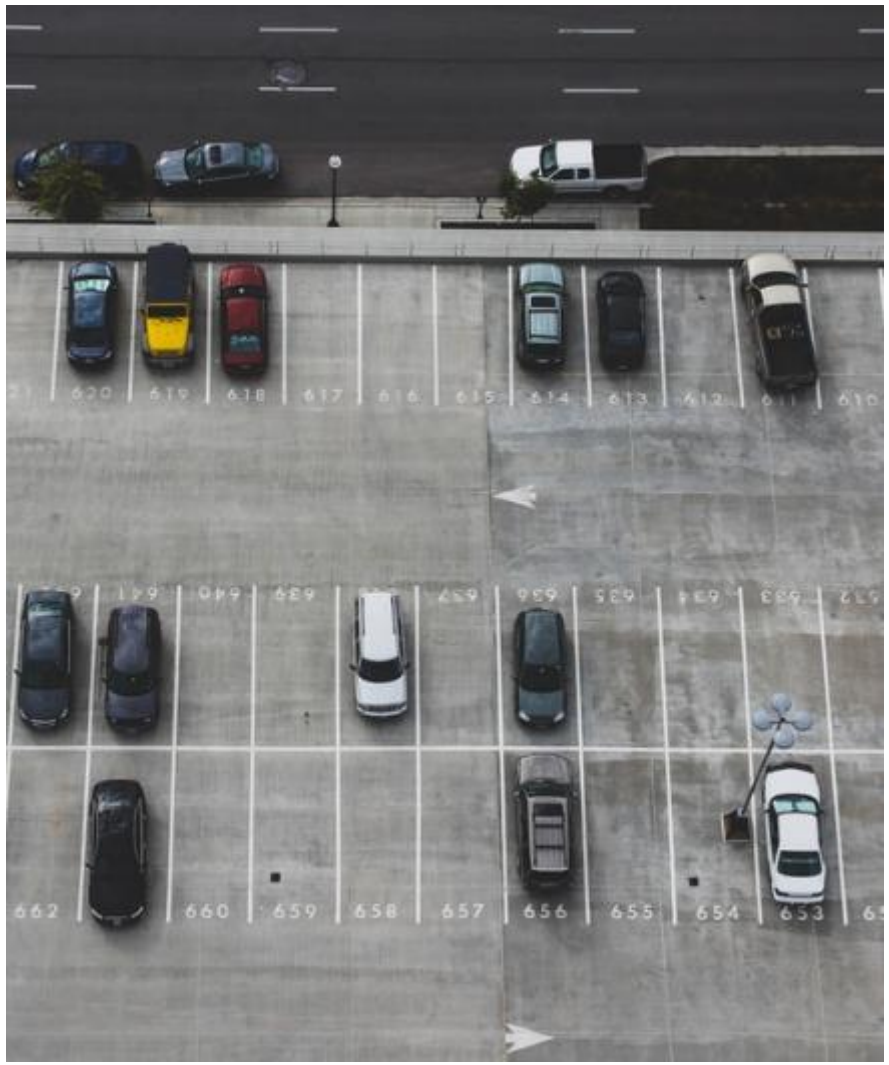
Key Inputs

- **Employee populations**: Citywide; with subsidized parking; with transit benefits
- **Employee commute characteristics:** Mode shares citywide; for those with subsidized parking; commute distance
- **Travel cost factors:** Market monthly parking and transit pass costs, converted to daily rates
- **Driver responses:** Elasticity of VMT with respect to parking costs; elasticity of transit ridership with respect to transit costs

Key Outputs

- **Reduction in vehicle travel:** Reduction in average daily commute VMT, determined using reduction in vehicle trips, trip lengths, and vehicle occupancies
- **Reduction in driving-related externalities:**
  - Congestion (in terms of average delay)
  - Emissions (CO_2e, NO_x, PM-2.5)
  - Crashes
- **Impacts on equity:** Explored through complementary analysis of American Community Survey (ACS) Public Use Microdata Sample (PUMS) and local household travel surveys

Key Adjustments



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- For California cities where some employers are already offering cash-out because of the statewide law, employees working for such employers are excluded from the analysis of the cash-out scenarios
- For scenarios entailing employer-paid transit/vanpool benefits or a transit pre-tax option, the proportion of employees already offered such benefits were excluded from the analysis; adjustments were made for this population if they would be eligible for cash-out under modeled policies
- Benefit values adjusted based upon taxation rules
- Baseline commute VMT upon which reductions were applied to scaled to reflect telework expectations post-pandemic (Mokhtarian, Wang, and Kim (2022))

Key Assumptions

- Full adoption and compliance
- Free workplace parking
- Near-term conditions
- Market parking rates
- Central business district (CBD) parking benefits offered at full market value
- No transit capacity restrictions
- Responsiveness to pricing and daily cash-out
- Crashes scale linearly with VMT

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Analysis Approach

Scenario 1: Monthly Parking Cash-Out

1. Estimate the average "opportunity cost" associated with the cash-out policy
2. Estimate VMT reduction by averaging results from two methods:
   - Calculated using University of South Florida's TRIMMS 4.0 model, accounting for change in price of parking (representing cash-out value as the "opportunity cost" of parking)
   - Calculated based on % change in cost of trip and travel price elasticity of -0.30
3. Results are adjusted to account for employees who additionally already have transit benefits

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Analysis Approach *(2)*

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Scenario 2: Monthly Commuter Benefit

- Same approach as Scenario 1, except the average transit cost (vs. cash-out value) was used as the modeled “opportunity cost” value
- Assumes 25% of employees who shifted to other non-SOV modes in TRIMMS would take a vanpool or transit benefit instead (since that’s where the incentive is)

Analysis Approach *(3)*

Scenarios 3 & 4: Monthly (S3) or Daily (S4) Cash-Out + Pre-Tax Transit Benefits

- On top of results of Scenario 1, added effects of a pre-tax transit benefit for employees without access to free parking
- Used elasticity of transit ridership with respect to transit price of -0.15 to calculate increase in transit riders
- For Scenario 4, daily cash-out was assumed to result in an additional 16% shift from solo driving beyond what the monthly offer would yield, based on results of Minneapolis Innovative Parking Pricing Demonstration (Lari et al. 2014)
- As in Scenario 1, an adjustment is made for employees receiving cash-out who are already receiving transit benefits

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Analysis Approach *(4)*

Scenario 5: Requirement to Eliminate Subsidized Parking Benefit + Provide Universal $5 Per Day Employer-Paid Non-SOV Commute Benefit

- Used similar approach to Scenario 1, with midpoint between TRIMMS analysis and elasticity calculations
- Analysis split into three groups, each with their own opportunity cost values:
  - Employees with fully subsidized parking
  - Employees who already have access to cash-out
  - Employees who do not have access to fully subsidized parking
- Transit and vanpool commuters would get the pre-tax, full $5 subsidy; other non-SOV modes would pay taxes on $5 subsidy
- Because this is a daily incentive, assume additional 16% shift away from drive-alone (like in Scenario 4)
- As in Scenario 1, an adjustment is made for employees who are already receiving transit benefits

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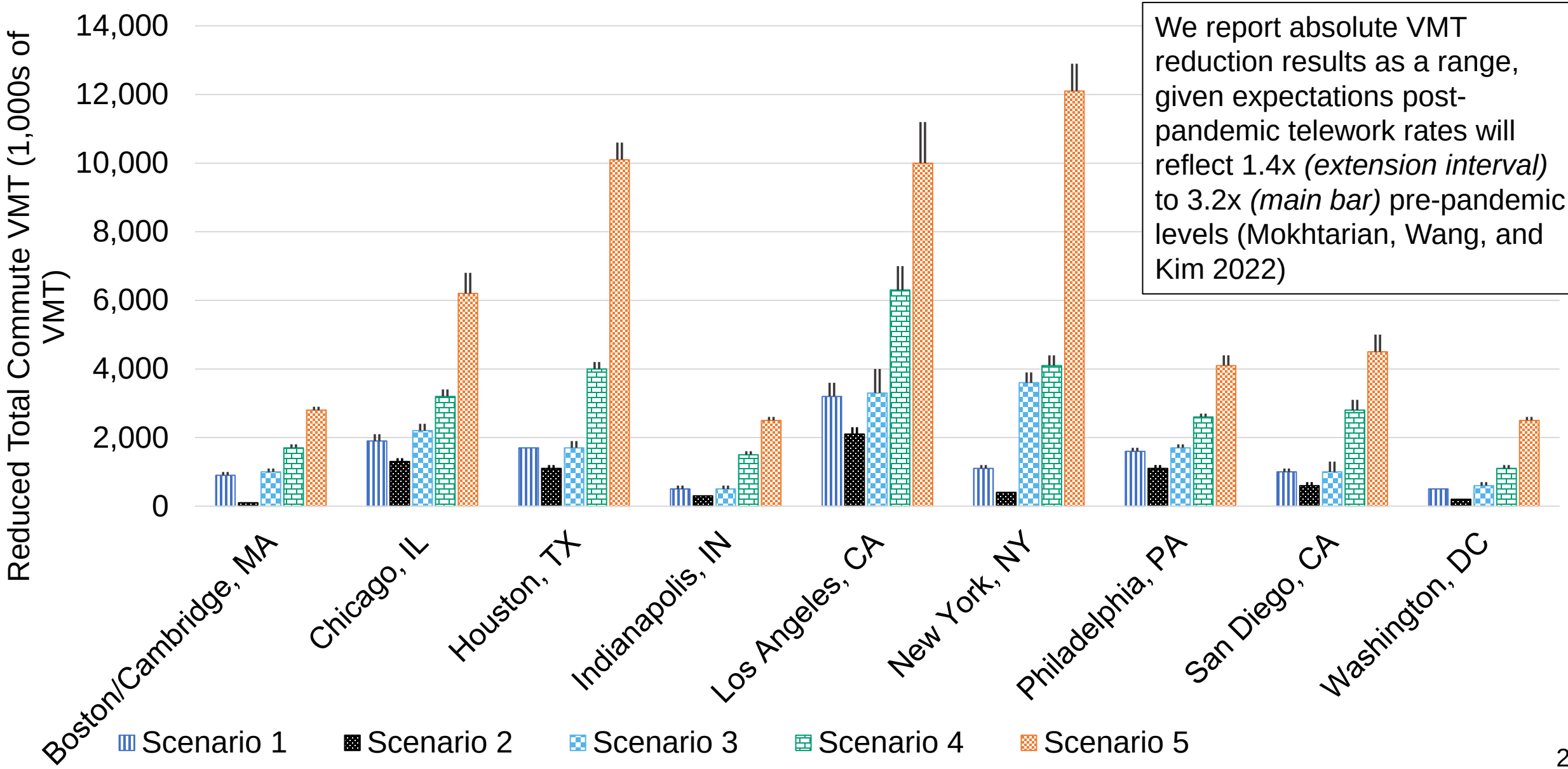
Estimating Congestion, Emissions, Safety, and Equity Impacts

Via TRIMMS 4.0 documentation

- Data to scale VMT to reductions in delay, emissions (CO_2e, NO_x, PM-2.5), and crashes were taken from TRIMMS 4.0 documentation:
  - Delay was estimated in daily hours of delay reduced due to VMT reductions using baseline citywide delay measures and a non-linear elasticity relating % reduction in delay to a 1% reduction in VMT
  - Emissions rates (g/mi) and crash rates (crashes per million VMT) from TRIMMS applied to VMT rates
- Discussion surrounding equity built referencing American Community Survey (ACS) Public Use Microdata Samples (PUMS) and regional household travel surveys

Results: Raw Reductions in Daily Citywide Commute VMT (in Thousands of VMT) by Scenario and City

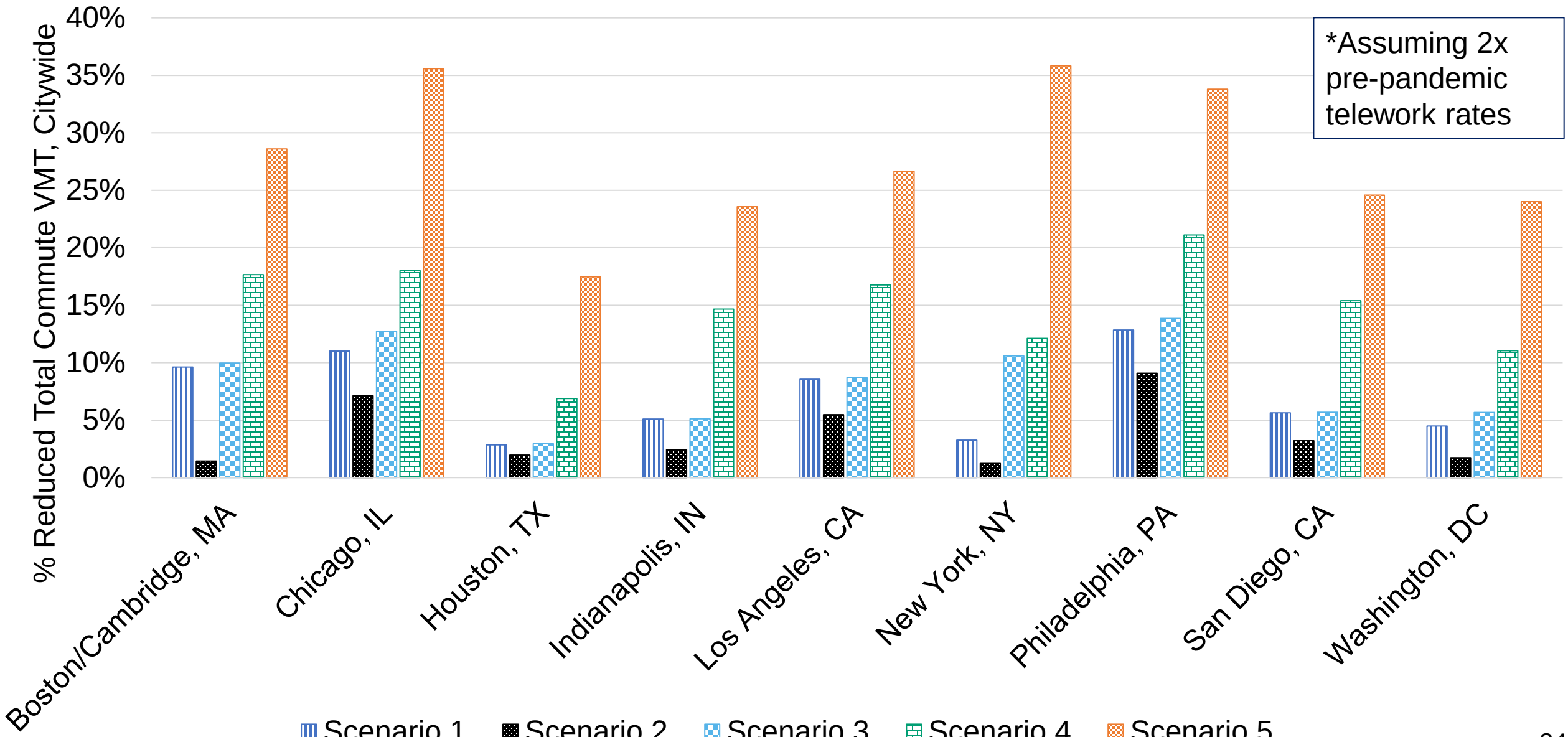


We report absolute VMT reduction results as a range, given expectations post-pandemic telework rates will reflect 1.4x *(extension interval)* to 3.2x *(main bar)* pre-pandemic levels (Mokhtarian, Wang, and Kim 2022)

Results: Percent Reductions in Daily Citywide Commute VMT by Scenario and City

City	S1: Monthly Cash-out	S2: Monthly Commuter Benefit	S3: Monthly Cash-out + Pre-Tax Transit Benefit	S4: Daily Cash-out + Pre-Tax Transit Benefit	S5: Eliminate Parking Subsidies + $5 Non-SOV Subsidy
Boston/Cambridge, MA	10%	1%	10%	18%	29%
Chicago, IL	11%	7%	13%	18%	36%
Houston, TX	3%	2%	3%	7%	17%
Indianapolis, IN	5%	2%	5%	15%	24%
Los Angeles, CA	9%	5%	9%	17%	27%
New York, NY	3%	1%	11%	12%	36%
Philadelphia, PA	13%	9%	14%	21%	34%
San Diego, CA	6%	3%	6%	15%	25%
Washington, DC	4%	2%	6%	11%	24%

Results: Percent Reductions in Daily Citywide Commute VMT by Scenario and City



Results Summary

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- The **two monthly cash-out scenarios**—Scenario 1 (monthly parking cash-out) and Scenario 3 (pre-tax transit benefit + monthly parking cash-out)—show **significant potential for reducing daily VMT**
- Scenario 2 (the option of an employer-paid **monthly transit/vanpool benefit** in lieu of free parking) shows **more modest reductions** than the monthly cash-out scenarios

Results Summary *(2)*

- Scenario 4 (pre-tax transit benefit + **daily parking cash-out**) shows **greater reduction potential** than Scenario 3
- Scenario 5 (a requirement that all employers **eliminate subsidized parking** and provide a **universal $5 daily non-SOV commute benefit**) offers the **greatest reduction potential** in all cities

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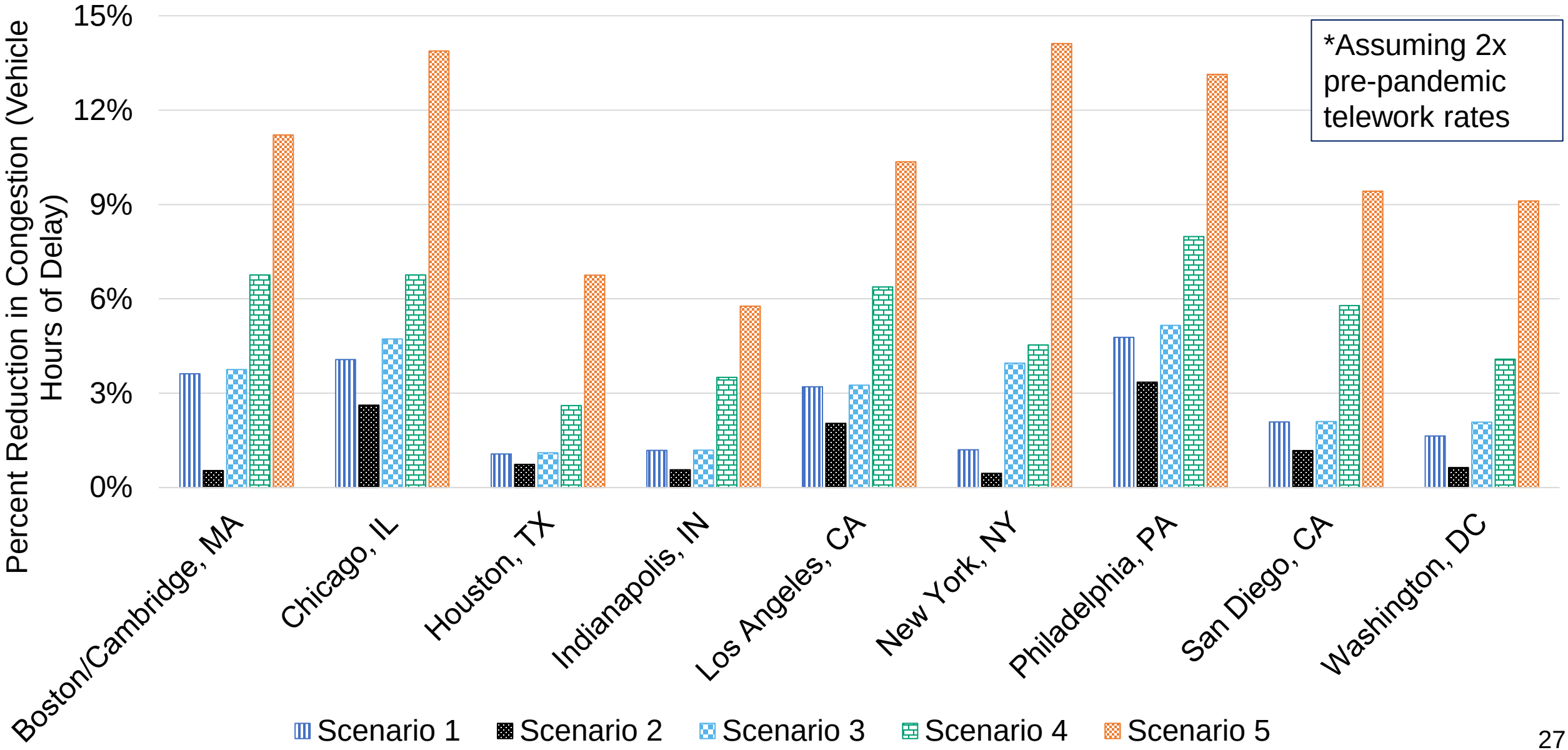
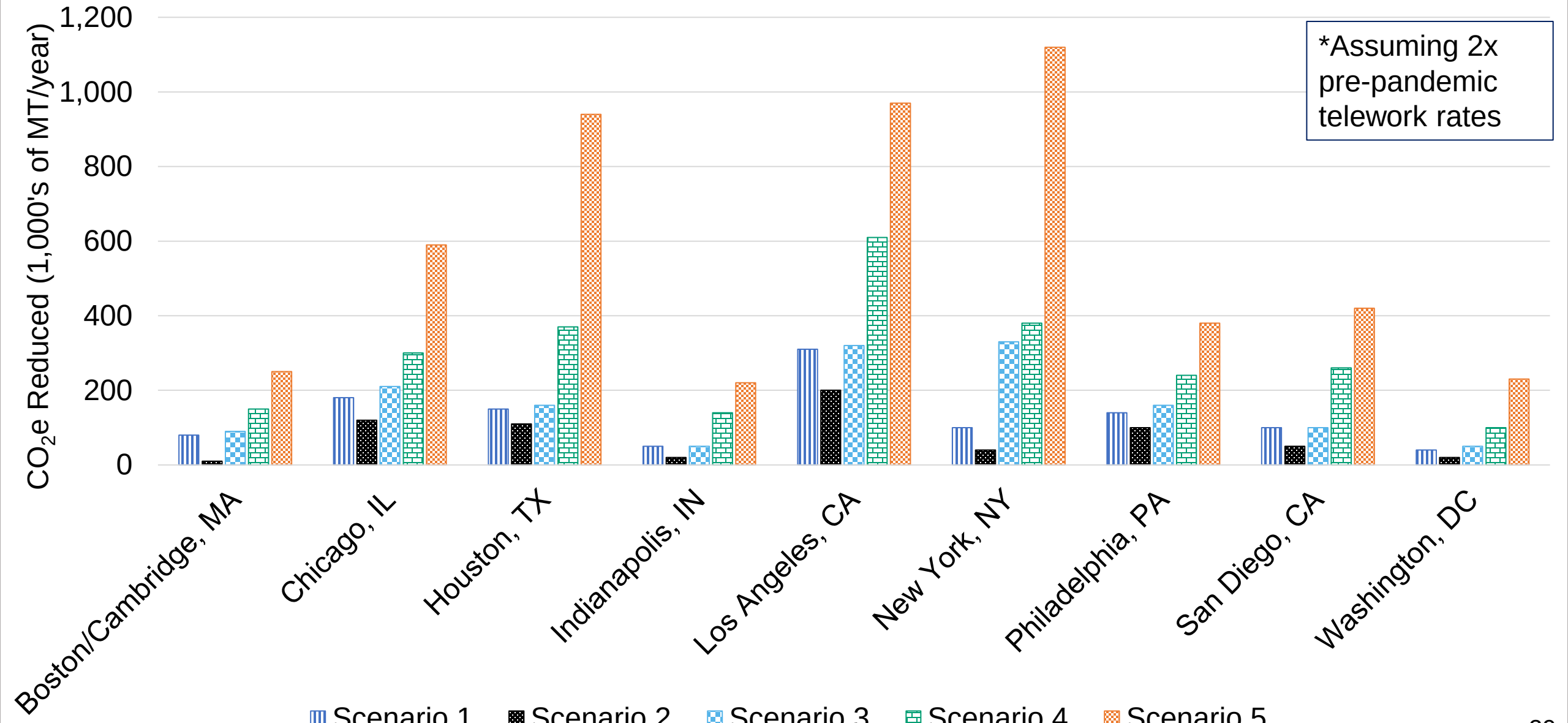
Results: Estimated Percent Reduction in Daily Peak Period Delay by Scenario and City



Results: Estimated Annual Hours of Delay Reduced

	Scenario 1	Scenario 5
Boston/Cambridge, MA	538,491	1,668,745
Chicago, IL	1,296,479	4,423,016
Houston, TX	1,060,807	6,706,831
Indianapolis, IN	153,868	750,149
Los Angeles, CA	1,951,845	6,313,558
New York, NY	505,000	5,942,803
Philadelphia, PA	895,430	2,464,452
San Diego, CA	392,995	1,779,457
Washington, DC	325,540	1,813,091

Results: Annual CO_2e Reductions by City and Scenario



Results: Impact of Reduced CO_2e

500,000 metric tons of CO_2e (close to the average annual reduction across cities for Scenario 5) is equivalent to…

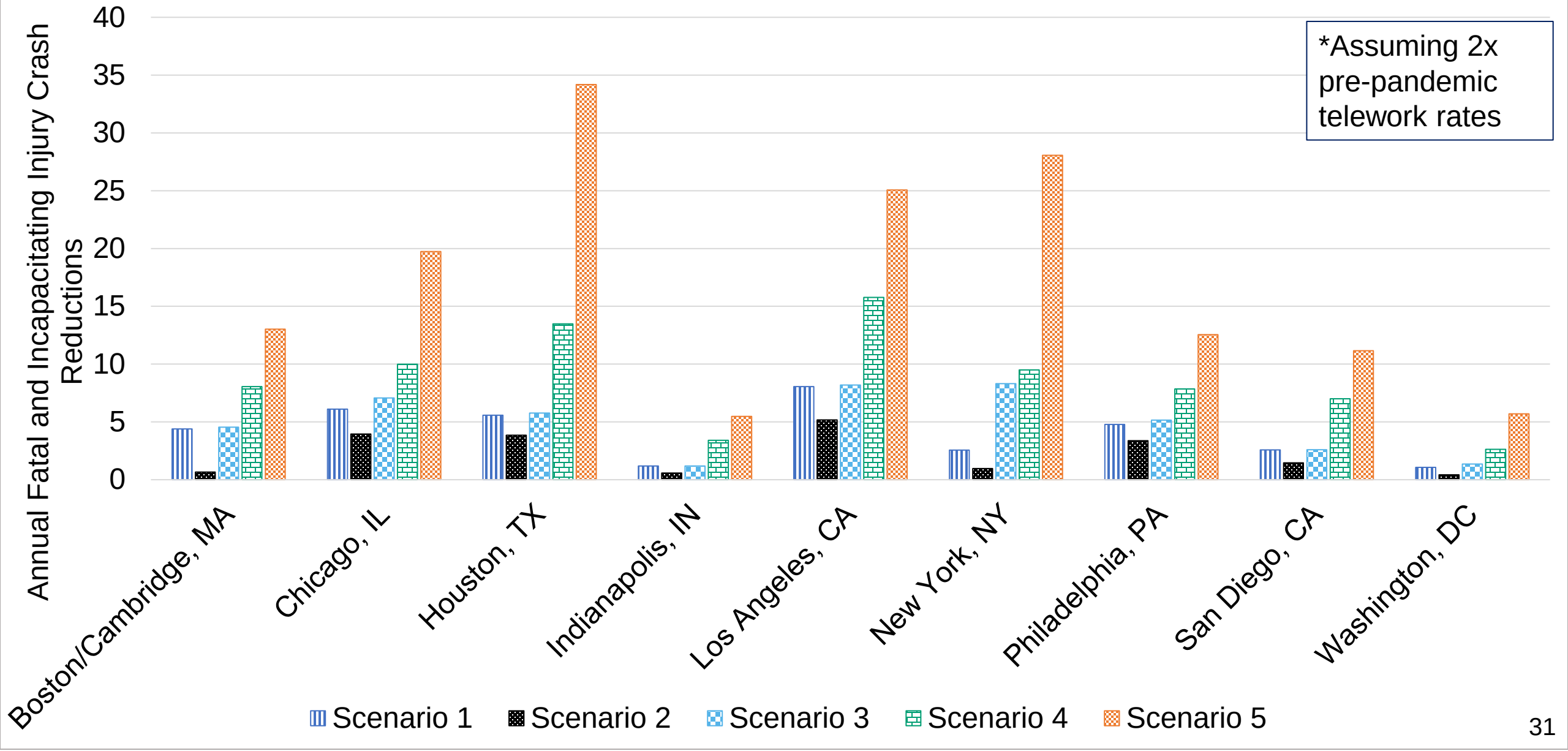
…the consumption of more than a million barrels of oil

…the energy use of more than 60,000 homes each year

…the carbon sequestered by roughly 8 million tree seedlings growing over 10 years

Equivalencies derived using EPA's Greenhouse Gas Equivalencies Calculator for 500,000 metric tons of CO_2e

Results: Annual Fatal and Incapacitating Injury Crash Reductions by City and Scenario



Results: Equity

The parking cash-out and related commuter benefits policies examined in this analysis have various implications for equity:

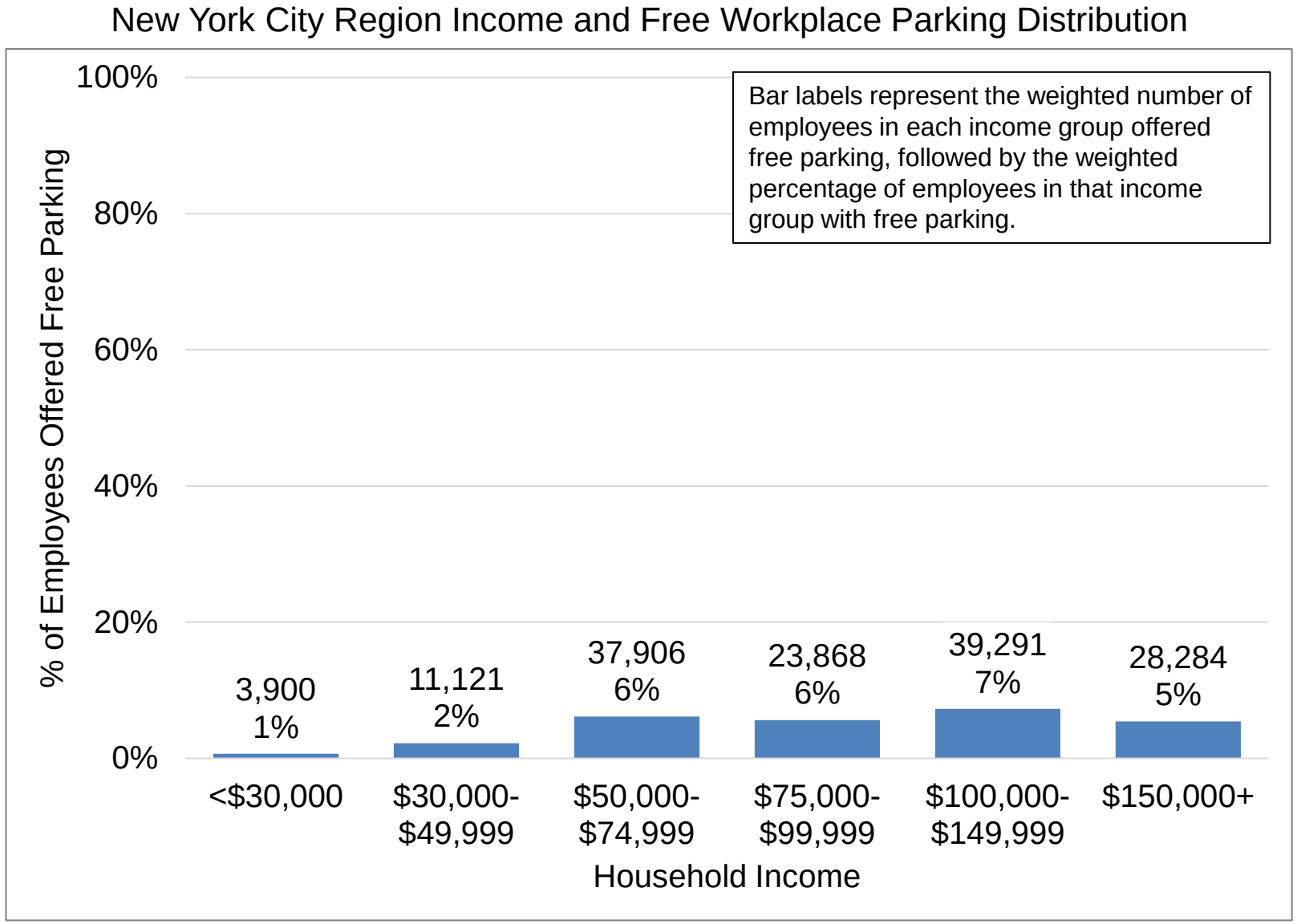
- As a starting point, if free parking is traditionally only offered to specific subsets of commuters (e.g., commuters working in certain industries, at specific income levels, etc.), it would **disproportionately benefit certain groups** of commuters over others
- Even if parking benefits are not offered equitably, however, **cash-out is equity enhancing,** as it provides an alternative benefit for those employees offered free parking but unable to take advantage of it due to **not owning a car** that is available for their commuting (either due to owning no vehicles or sharing a vehicle with other household members who may need it) **or living in a location where driving to work is not the most convenient alternative**

Results: Equity *(2)*

- Scenarios 3, 4, and 5 offer a benefit to all employees, versus only those who received parking subsidies (and would be eligible for cash-out), enhancing equity compared to Scenarios 1 and 2 by **expanding the employee population receiving any commuter benefit**:
  - Pre-tax transit benefits in Scenarios 3 and 4 may be offered but not *realized* by employees who are unable (or unwilling) to commute via transit or vanpool
- The proportion of **employees able to realize a benefit** offered is expected to be **greatest under Scenario 5** with a universal non-SOV commute benefit:
  - In general, the **lowest-income households** exhibit **lower rates of vehicle ownership** and **higher rates of walking or biking** commuting compared to higher income households (McKenzie 2014)
  - If these commuters cannot switch from walking or biking to another mode, and don't receive workplace parking subsidies (and so are ineligible for cash-out under other scenarios), they would realize the greatest benefit out of Scenario 5

Results: Equity *(3)*

- Distribution of parking subsidies and transit commuter benefits varied by income level and industry in many cities
  - Example case: New York City Region, using weighted data from the 2010/2011 Regional Travel Survey (NYMTC 2014)



Results: Equity *(4)*

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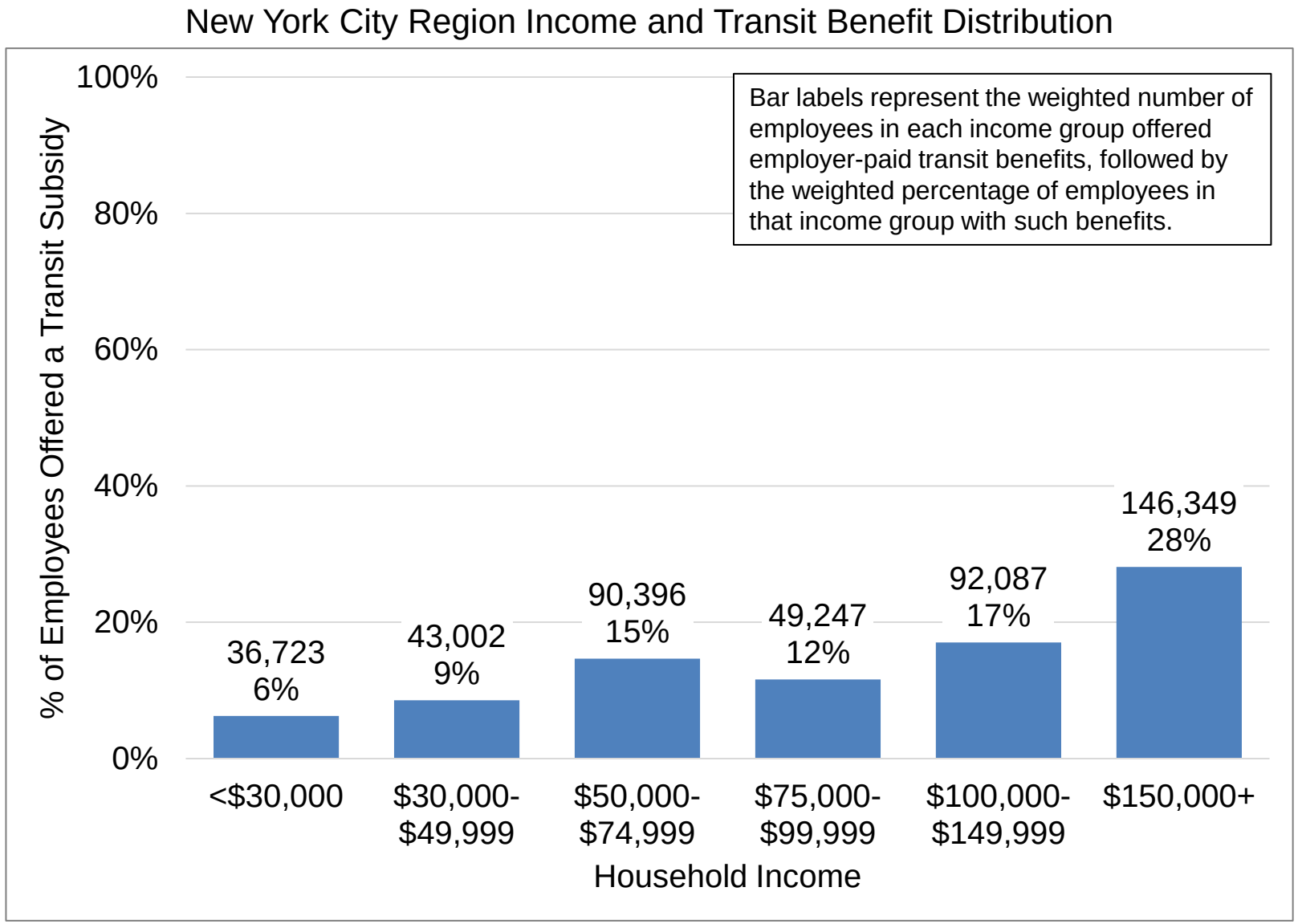

Questions & Contacts

- Report on this work is forthcoming
- Additional questions may be directed to Allen Greenberg, FHWA Office of Operations (Allen.Greenberg@dot.gov)

Presentation References:

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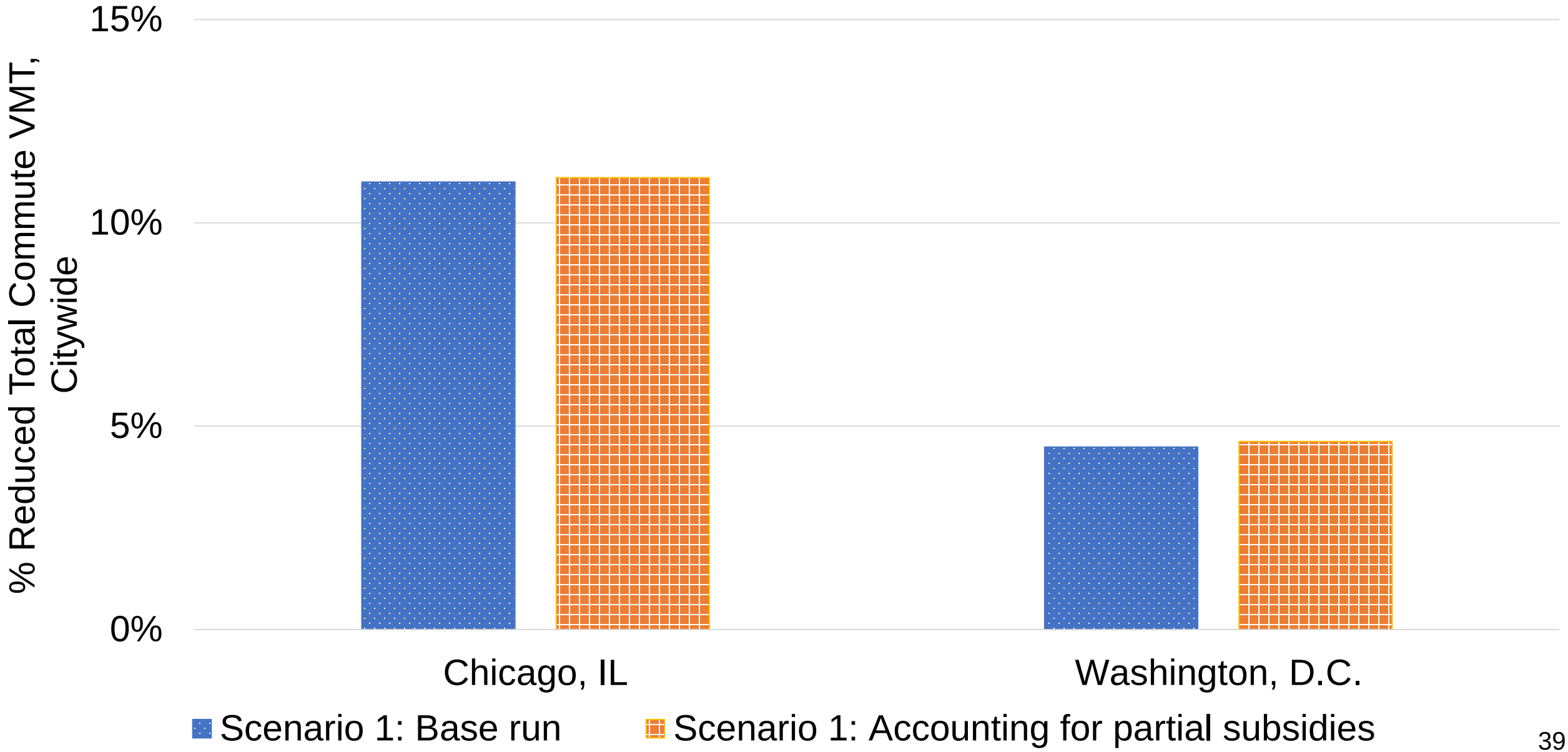
Supplemental Findings

- In addition to the core analysis presented, **additional analyses** were conducted to:
  - Observe VMT reduction results for **affected commuters only** (versus citywide) for Scenarios 1 and 2
  - Examine the impact of **partial parking subsidies** (versus fully subsidized parking), using Scenario 1 as an example
  - Determine how results would be affected if **small employers** (<20 employees) are **exempted** from Scenarios 1 and 3

Affected Commuters vs. Citywide Impacts: Percent Commute VMT Reduction Comparison by Scenario and City

	S1: Monthly Cash-out (Citywide)	S1: Monthly Cash-out (Affected Commuters Only)	S2: Monthly Commuter Benefit (Citywide)	S2: Monthly Commuter Benefit (Affected Commuters Only)
Boston/Cambridge, MA	10%	15%	1%	15%
Chicago, IL	11%	23%	7%	16%
Houston, TX	3%	7%	2%	5%
Indianapolis, IN	5%	6%	2%	3%
Los Angeles, CA	9%	11%	5%	9%
New York, NY	3%	25%	1%	12%
Philadelphia, PA	13%	19%	9%	16%
San Diego, CA	6%	7%	3%	4%
Washington, DC	4%	10%	2%	12%

Partial Parking Subsidies: Percent Commute VMT Reduction Comparison to Full Parking Subsidies in Scenario 1



Exemption of Firms with <20 Employees: Percent Commute VMT Reduction Comparison to No Exemption by Scenario and City