Choosing Smart Locations:
A GIS Tool for Better Facility Siting

New Partners for Smart Growth

February 4, 2017

GSA Business Context

375+ million square feet for 1 million workers

8,700 buildings in **2,000+** communities

482 historic buildings with 80+ NHLs

Annual buildings budget of **$10 Billion**

Courthouses, border stations, IRS offices…

EPA Office of Sustainable Communities

Helps communities pursue smart growth strategies through:

- **Grants and technical assistance**
- **Partnerships**
- **Research and tool development**

Smart Growth
PROGRAM

Overview

- EPA's Smart Location Database
- Smart Location Calculator overview
- SLC application
- Q&A

Why model VMT?

- Location of federal/state facilities impacts local communities:
  - Development and sustainability goals
  - Land conservation
  - Access to employment and services
  - Congestion, pollution, fuel consumption
  - Infrastructure costs/impacts
- National modelling can support more informed planning & better understanding of impacts
- Promote location efficient site decisions

Introduction to the Smart Location Database

- Density
- Diversity
- Design of Street Network
- Destination Accessibility
- Distance to Transit

Image sources: Lincoln Land Institute's "Visualizing Density" and Victor Dover

Introduction to the Smart Location Database

- EPA's Smart Location Database (SLD)
  - Nationwide geographic data resource including more than 90 attributes summarizing characteristics such as diversity of land use, neighborhood design, destination accessibility, employment, and demographics.
  - Data sources include American Community Survey, NAVTEQ streets, Longitudinal Employment Household Dataset
  - Find more information about the SLD, including interactive mapping, data downloads and user guide at http://www2.epa.gov/smartgrowth/smart-location-mapping#SLD

Background to the Smart Location Calculator

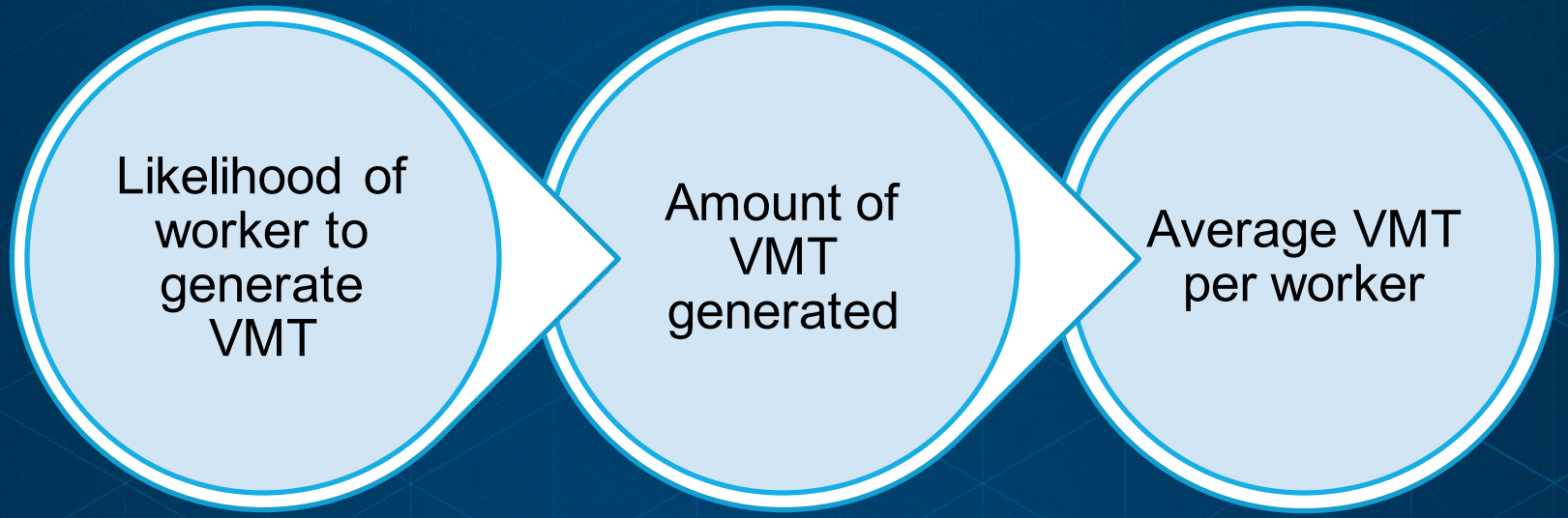
- Much like energy efficiency, location efficiency reduces resource demands while fostering a healthier, more sustainable built environment and providing equitable access to government jobs and services.

- Location-efficient commercial facilities are generally:
  - Accessible via multiple transportation options, including public transit and active transportation;
  - Centrally-located within their "commute shed" or region so as to maximize accessibility and minimize travel distances for employees and other users; and
  - Integrated within a mixed-use environment that offers easy access to services and destinations.

SLC Research Questions

- What measures of location efficiency would enable us to compare facility locations relative to each other – ie put numbers to the policy?
- How can we fill the gap where there has been little research into the effect of the built environment around workplace locations?
- How can we estimate worker vehicle miles traveled (VMT) and greenhouse gas emissions (GHG) associated with that travel?

SLC Model: Modelling Process



SLC Results

- The block group scores are categorized using the following scale:

90-100 = Excellent

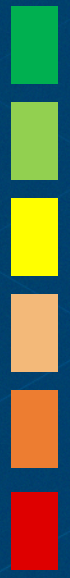
80-89 = Very good

70-79 = Good

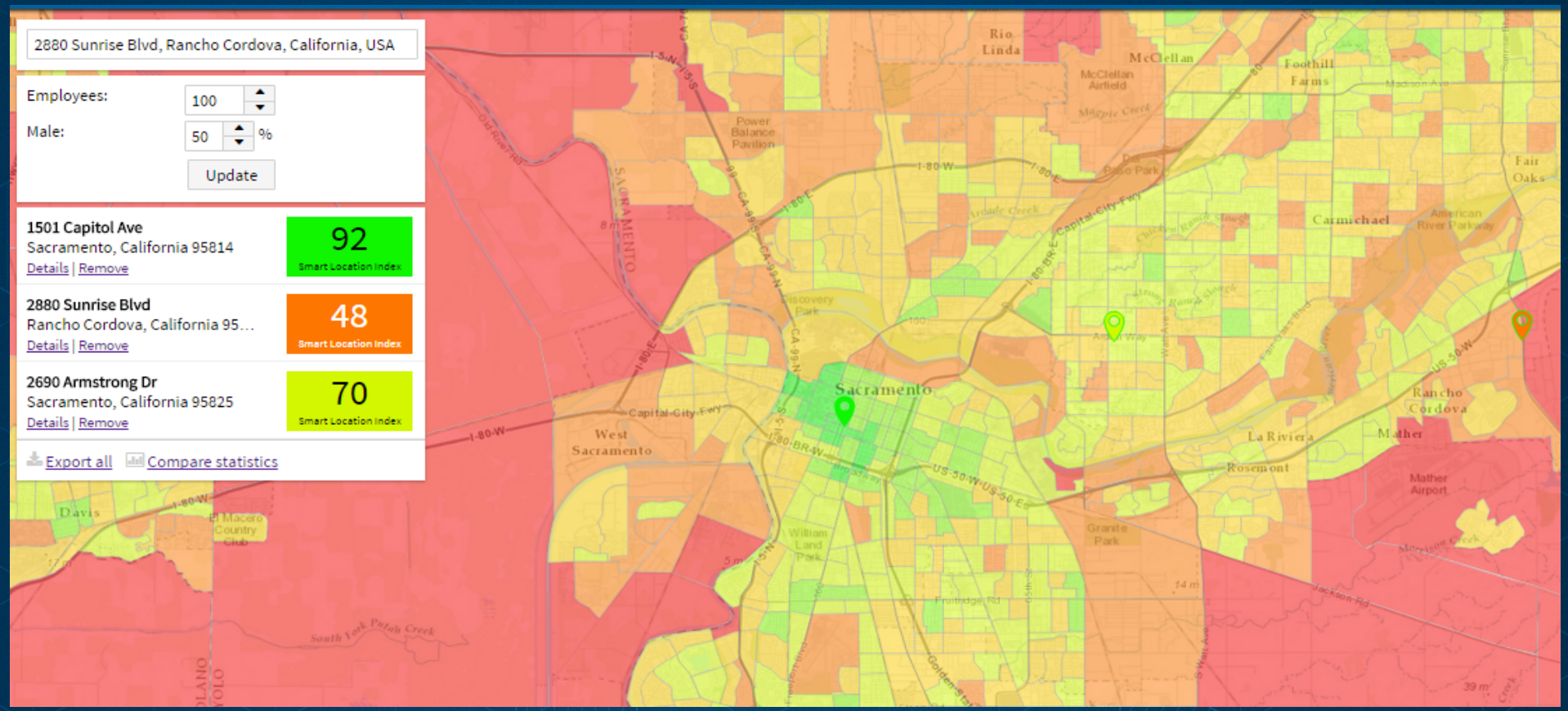
60-69 = Fair

40-59 = Low

<40 = Very low

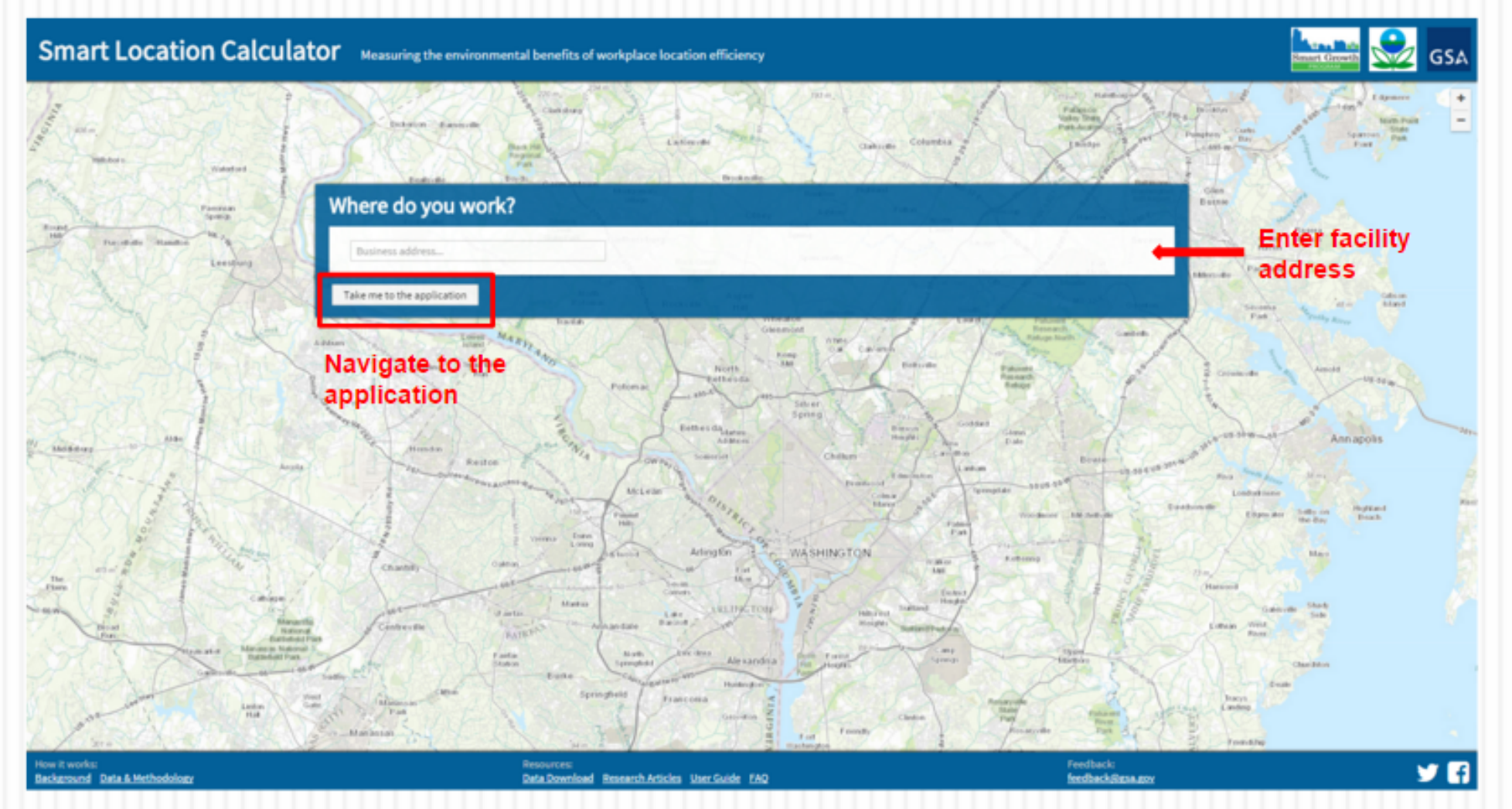


SLC Demonstration



https://www.slc.gsa.gov/slc

SLC Demonstration



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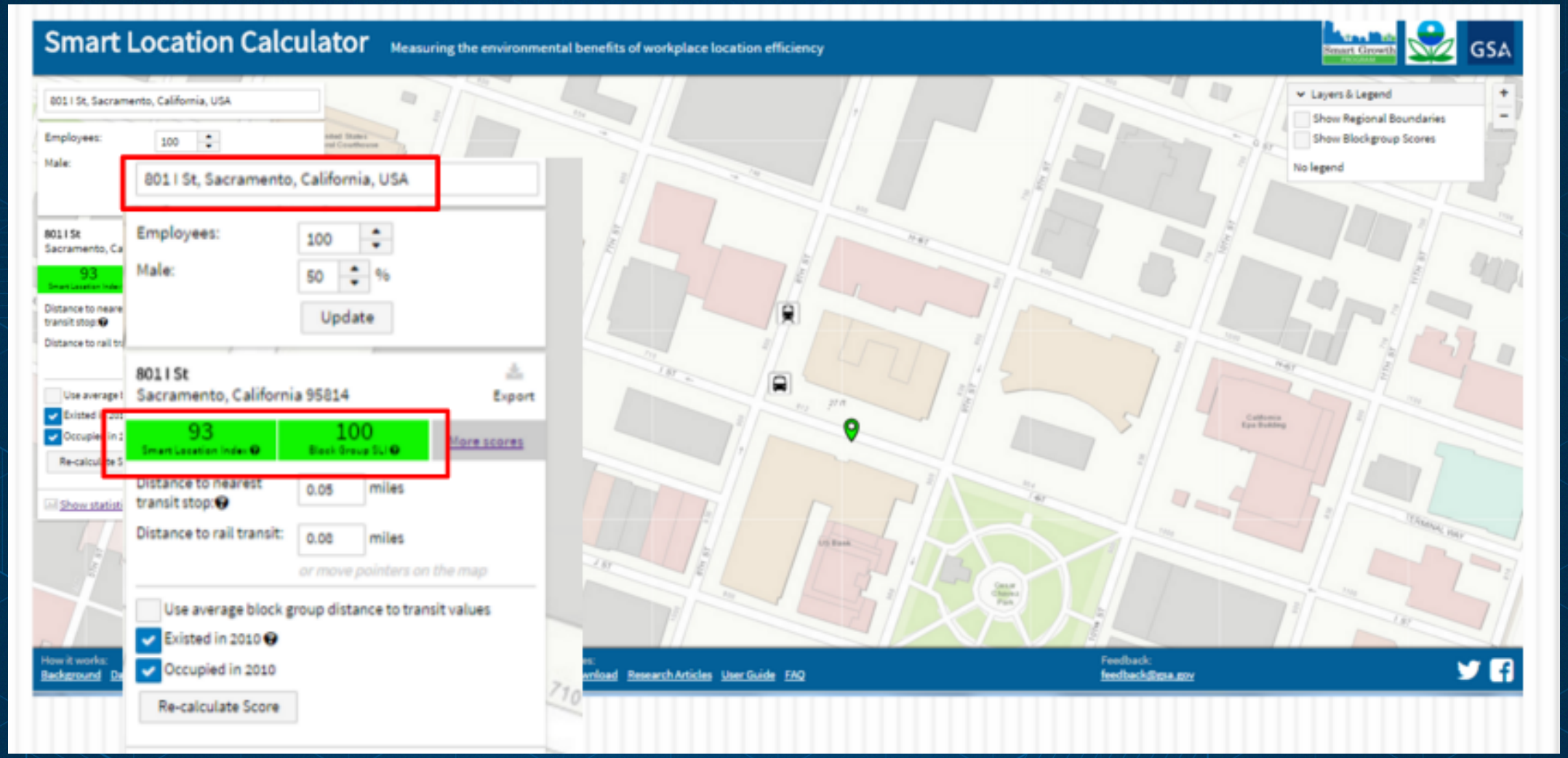

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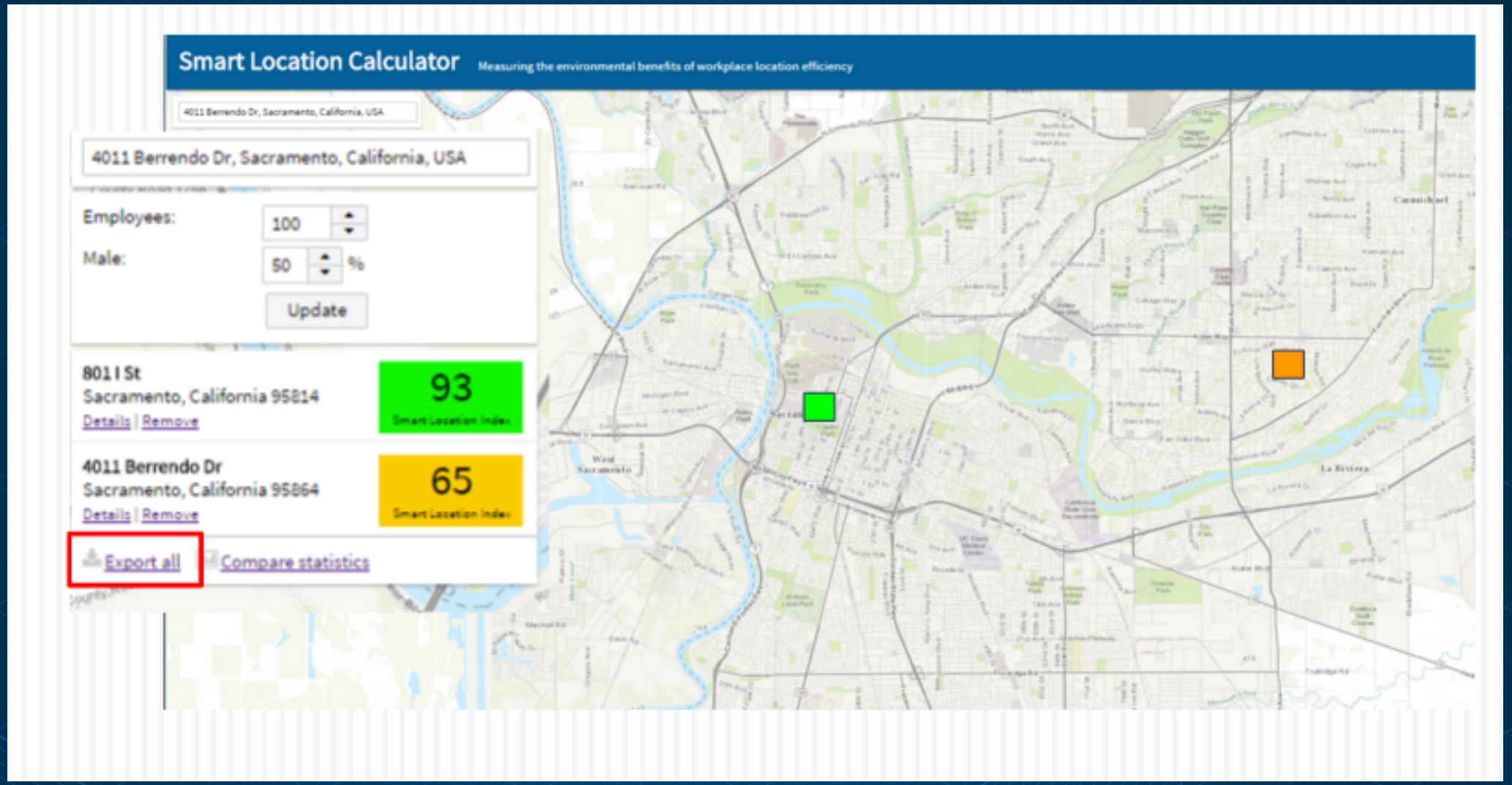

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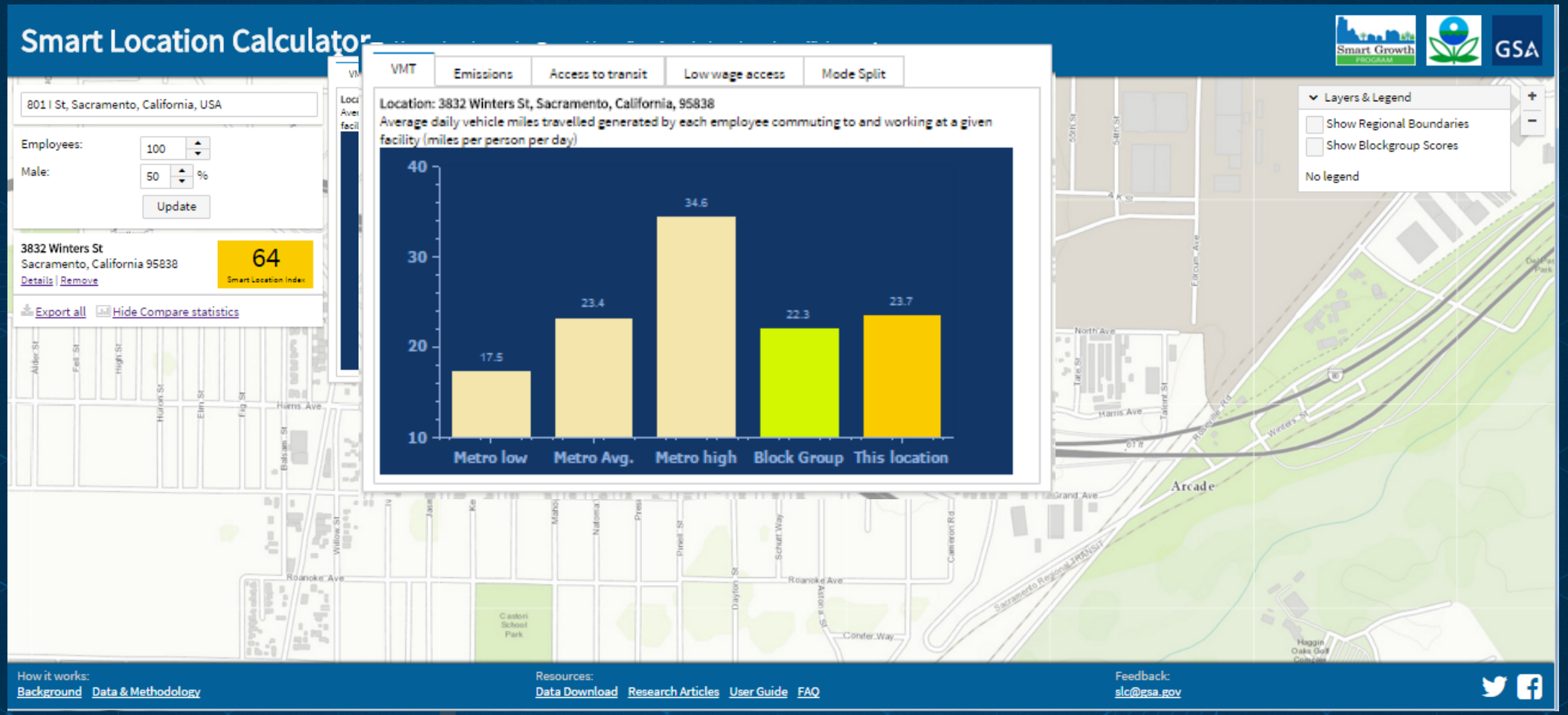
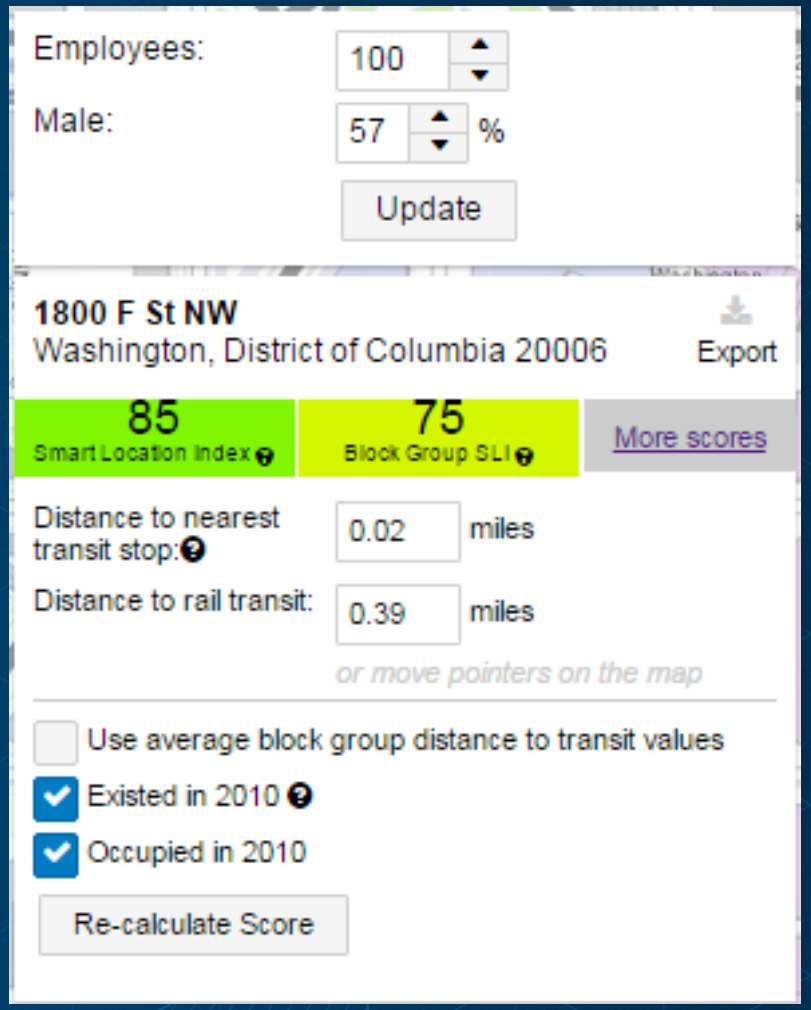


SLC Block Group vs Facility Scores

- User-entered data
- Distance to transit
- ¼ mile buffer
  - Tool adjusts for edge effects
  - Variables impacted: residential and employment densities, network variables (links), transit density, access, land use mix



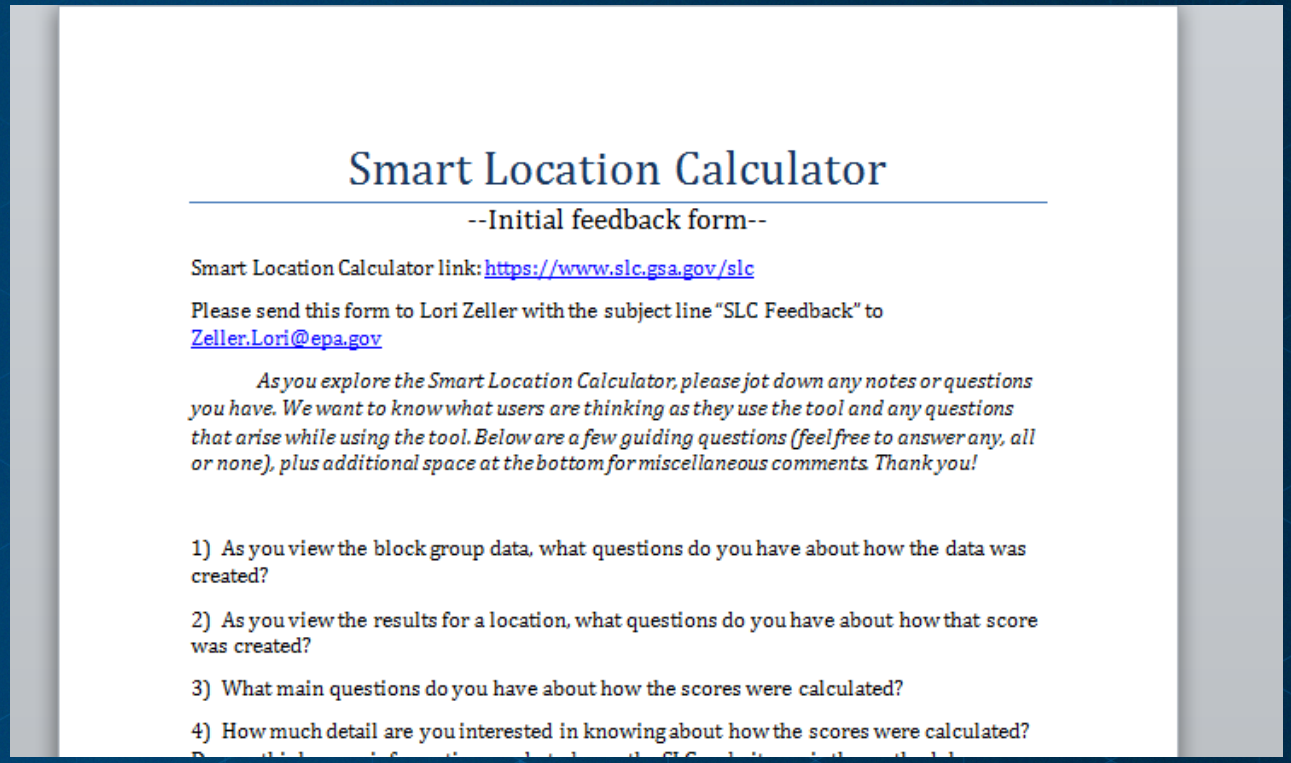
SLC Application

- GSA Application
  - National Measure (since 2016)
  - Local Portfolio Planning
  - Lease Acquisiton Planning
- State facilities and strategic planning
  - California Strategic Growth Council & Dept. of General Services
  - Future state partnerships (RGGI)
- Rating systems
  - Use of the SLC to measure community compactness/site sustainability

Testing and Feedback

- Questions
- Use case scenarios
- Enhancements
- Methodology critique

https://www.slc.gsa.gov/slc



Smart Location Calculator

--Initial feedback form--

Smart Location Calculator link: https://www.slc.gsa.gov/slc

Please send this form to Lori Zeller with the subject line "SLC Feedback" to Zeller.Lori@epa.gov

As you explore the Smart Location Calculator, please jot down any notes or questions you have. We want to know what users are thinking as they use the tool and any questions that arise while using the tool. Below are a few guiding questions (feel free to answer any, all or none), plus additional space at the bottom for miscellaneous comments. Thank you!

1) As you view the block group data, what questions do you have about how the data was created?

2) As you view the results for a location, what questions do you have about how that score was created?

3) What main questions do you have about how the scores were calculated?

4) How much detail are you interested in knowing about how the scores were calculated?

Email slc@gsa.gov

Questions

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Appendix

Additional slides follow with more information about the SLC modeling process

SLC Model: Independent Variables

A few example variables and their impact on VMT

- Density of development in workplace block group
  - Gross residential density ↑ VMT ↓
  - Gross employment density ↑ VMT ↓
- Street design characteristics in workplace block group
  - Auto-oriented links per square mile ↑ VMT ↑
  - Pedestrian-oriented links per square mile ↑ VMT ↓

SLC Model: Commute vs. Non-Commute Travel

Commute Travel	Non-Commute Travel
Home-Work Any trip made between home and work, including all legs of trip (stopping to drop off child, go shopping, go to gym, etc.)	**Work-work** Any trip starting and ending at a workplace. Includes mid-day lunch trips, business outings, or trips from one workplace to another

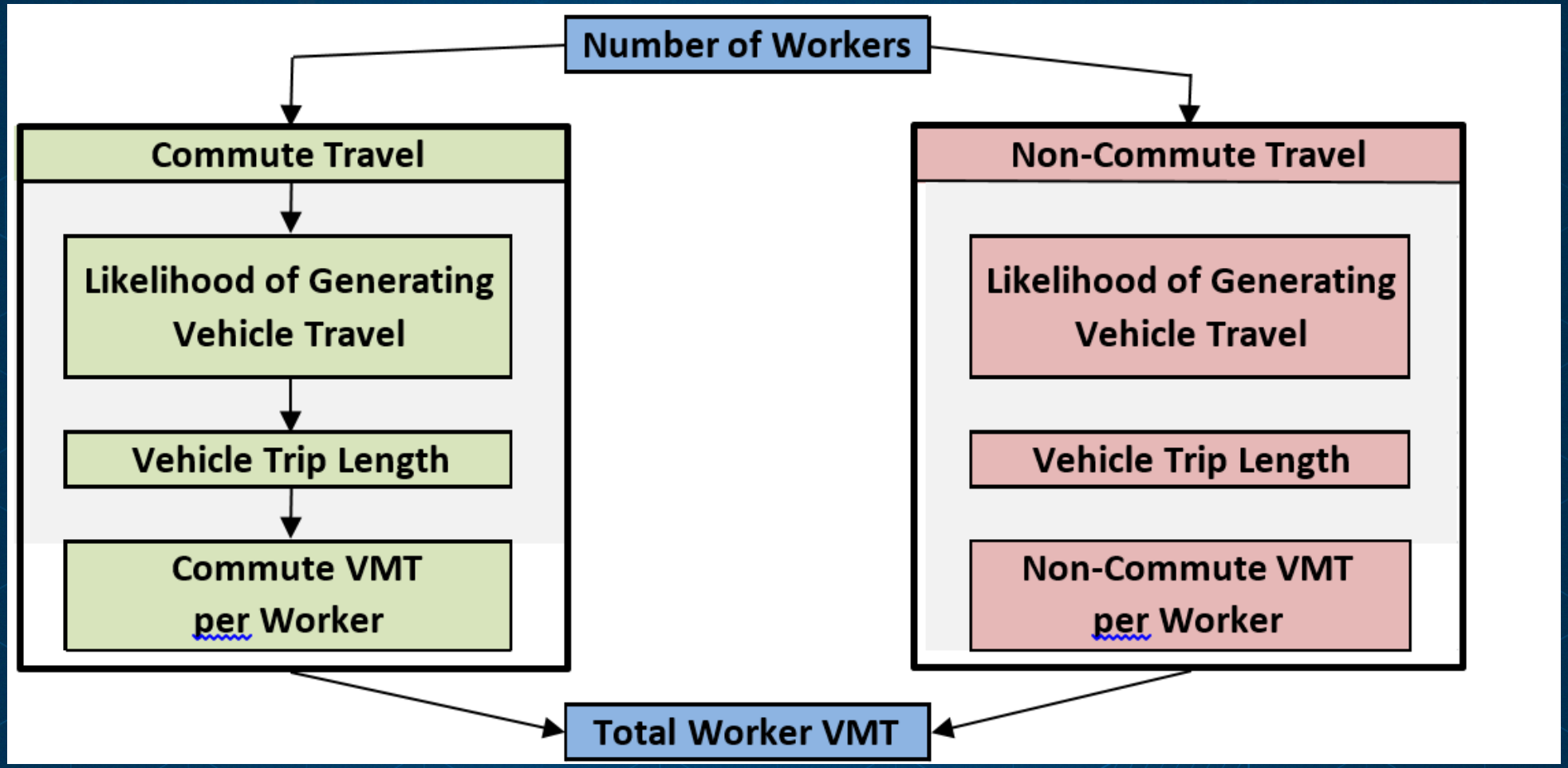
Home-based-other trips were removed from dataset (trips from home to social events, shopping, recreation, etc)

SLC Model: Factors Affecting VMT

	Commute VMT	Non-Commute VMT
Jobs Density	■	■
Housing Density	■	
Employment Mix		■
Job/ Housing Balance	■	
Pedestrian Oriented Network	■	
Transit Proximity		■
Transit Density	■	■
Auto Accessibility for Workers	■	
Transit Accessibility for Workers	■	
Regional Compactness	■	■
Regional Transit Trips per Capita	■	■

** Other factors: income, car ownership, gender, gas price*

SLC Model: Modeling Process



SLC Model: Smart Location Score Calculation

After VMT modeling is complete, each block group is evaluated relative to the other block groups in its region (CBSA or county)

$$\text{Smart Location Score} = 100 * \left(1 - \frac{VMT\_tot - VMT\_tot\_min}{VMT\_tot\_max - VMT\_tot\_min}\right)$$

where VMT_tot_min and VMT_tot_max are the minimum and maximum VMT_tot scores for the region