Maximum Mode Shift: A VMT Reduction Study
TPP Advisory Work Group

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Study Goal

Estimate the maximum mode shift possible, given existing land use patterns and travel needs.

- Help set VMT reduction & mode share targets
- Identify geographies, trip types, demographic groups where mode shift has the greatest potential
- Alternative to forecast models
- Move towards target-based planning

Project will develop open-source, reproducible tools, allowing the study to be repeated over time.
Research Questions (1)

With land use, transportation system, and travel patterns held constant,

how much travel can be shifted away from driving towards other, less carbon-intensive modes?

“Could they have taken transit for this trip?”
Research Questions (2)

To what extent does the potential for, or cost of, mode shift vary across:

- **geography**, e.g. community type, transit market areas, job and activity centers?
- **demographic** groups including age, gender, income, disability status, and race?
- **trip types**, such as errands or commutes?
- **time** (2018-2019 vs. 2020-2021 TBI; future years as they become available)
Research Questions (3)

• How much mode shift potential is lost when travel is evaluated in the context of related (linked) trips?
• Which communities or households have enough time in their day to shift travel from driving to other modes?
• To what degree would drastic improvements to the [bike, walk, transit] system increase mode shift potential, if they were made today?

“Could they have taken transit for this trip…

…and dropped off their kid at daycare along the way?”
Project tasks: re-routing trips

“Could she have made this trip by [transit, walk, bike]?”

- **All 500,000 + trips** in the Travel Behavior Inventory (2019, 2021) will be routed as if they had been made by transit, walking, biking, or driving.
- Transit trips will rely on the transit system *as it existed at the time*
- Re-routing will consider arrival/departure times for certain trips (e.g., work); but exact details are still being discussed within the project team
“Would she have been able to make the shift?”

After re-routing trips, we will trim down all possible trips to those that were actually feasible, given limitations of:

- Time (trade-off between driving and other modes)
- Physical ability (e.g., not counting overly long walk or bike trips)
- Safe infrastructure (e.g, evaluating bike trips by level of traffic stress, walk trips by level of traffic on a road)

Perfect data are not available for all of these considerations: there is no regional sidewalk inventory, and the regional bike network inventory is out-of-date.

Our estimates of mode shift feasibility will be coarse, optimistic, and iterative, laying the foundation for more detailed study, and updating as new data becomes available in future years’ studies.
Using a “5% rule” to determine feasibility

If less than 5% of people are observed doing this in the TBI, it’s probably not a thing people would do.
Project tasks: hypothetical scenarios

- Would drastic improvements to the [bike, walk, transit] system increase or decrease mode shift potential, if they were complete today?
- Not a forecast, but exploring some outer bounds of the possible
- Region-wide, systematic changes illustrative of big changes, while avoiding cumbersome network coding

“What if the entire bike network was upgraded to protected bikeways?”

“What if every transit route had a maximum ten-minute headway?”

Regional Bike Inventory Map, 2016
Questions?

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