

ENVISIONING OPPORTUNITIES IN MULTIMODAL TRANSPORTATION PLANNING

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Young Minds Present: Student Paper Awards Preview
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PRESENTATION OVERVIEW

- 1. Introduction**
- 2. Transportation challenges and issues**
- 3. Accommodating Future Travel Demand**
- 4. Prioritizing Transportation Initiatives**
- 5. Final Conclusions**

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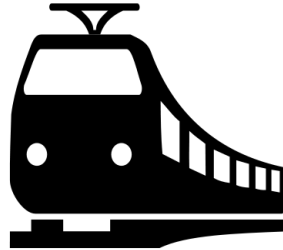
TRANSPORTATION IS MULTIMODAL AND MULTIDISCIPLINARY



CYCLING



TRANSIT



RAIL



PEDESTRIAN



CARPOOL



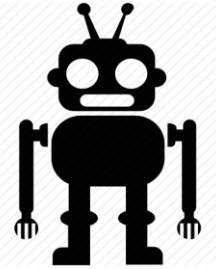
SINGLE-
OCCUPANT
DRIVER



HEALTH



POLITICS



TECHNOLOGY

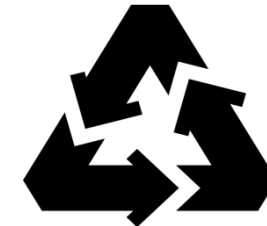


COMMUNITY

MULTI-
DISCIPLINARY

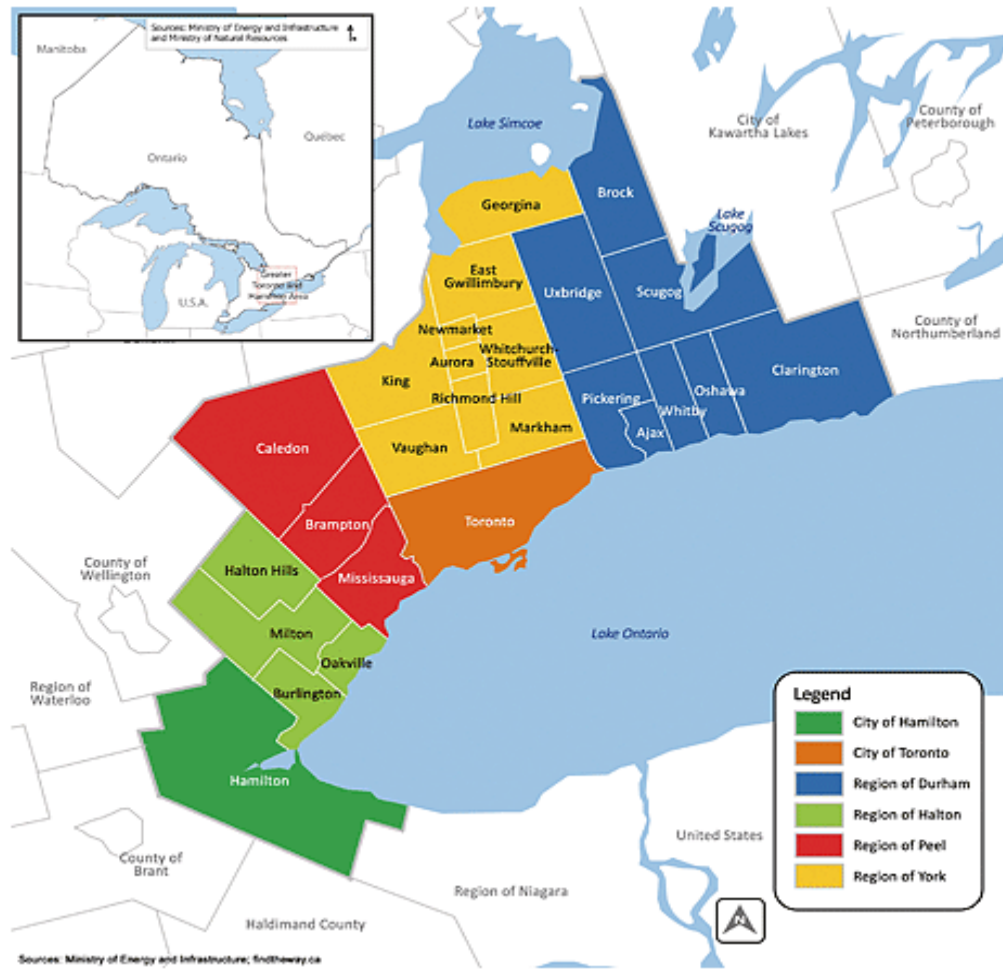


ECONOMY

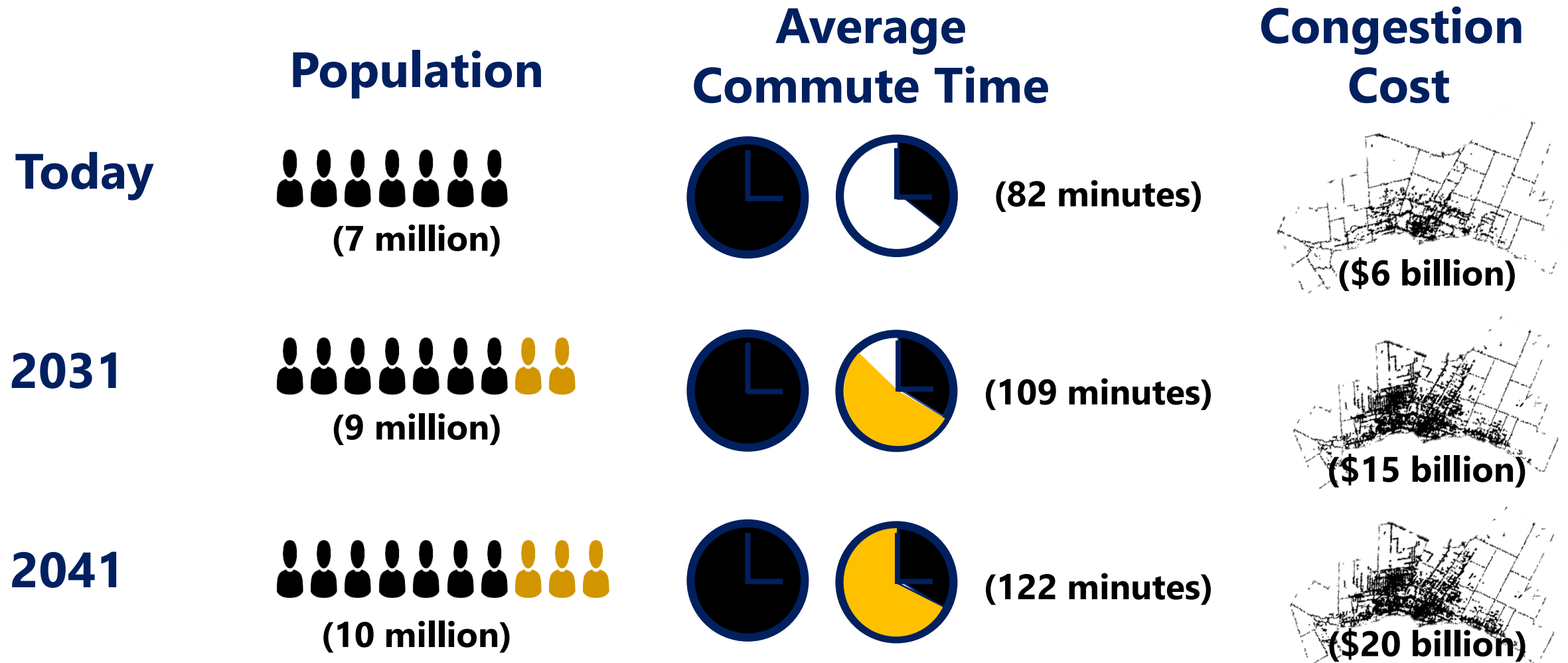


ENVIRONMENT

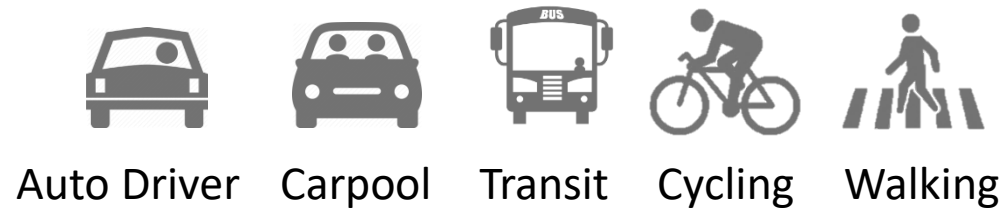
THE GREATER TORONTO AND HAMILTON AREA



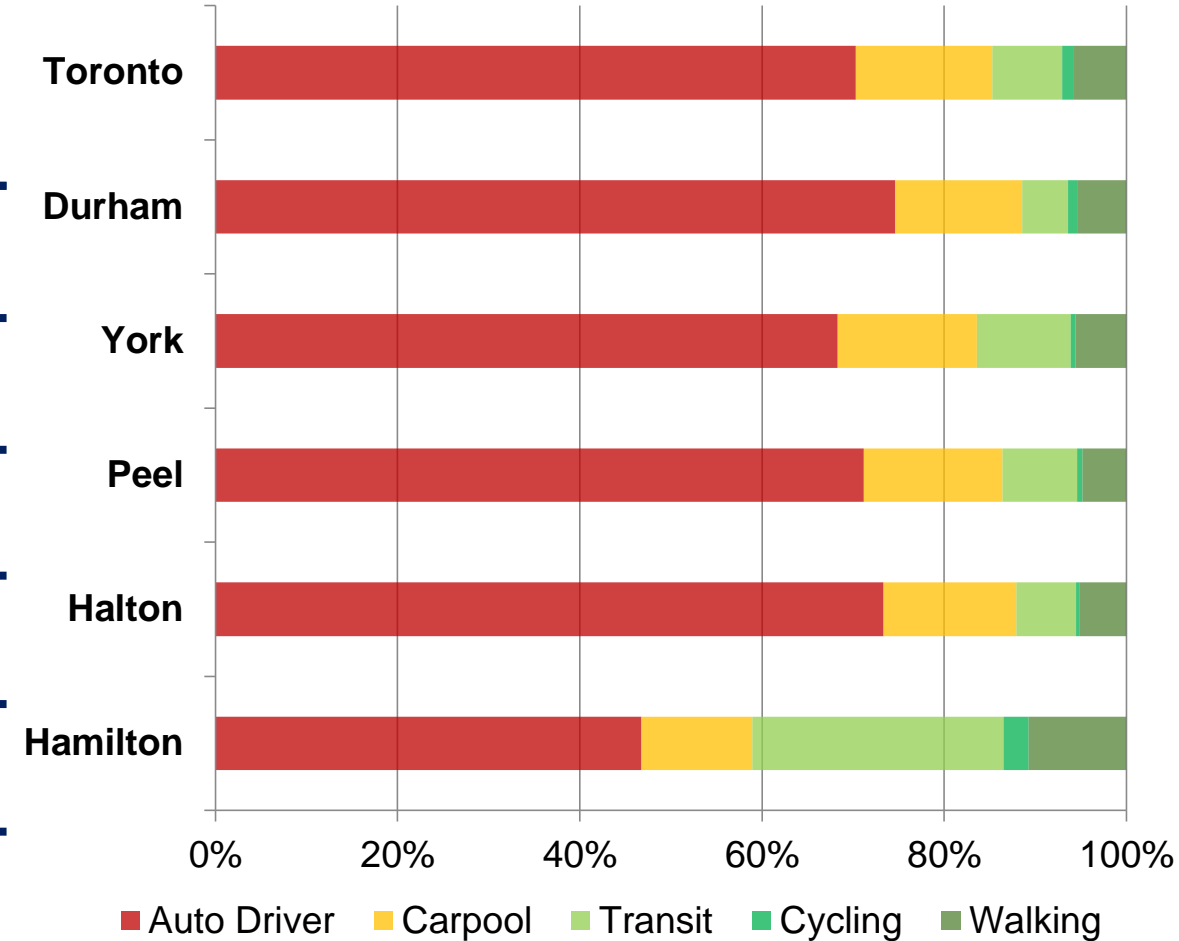
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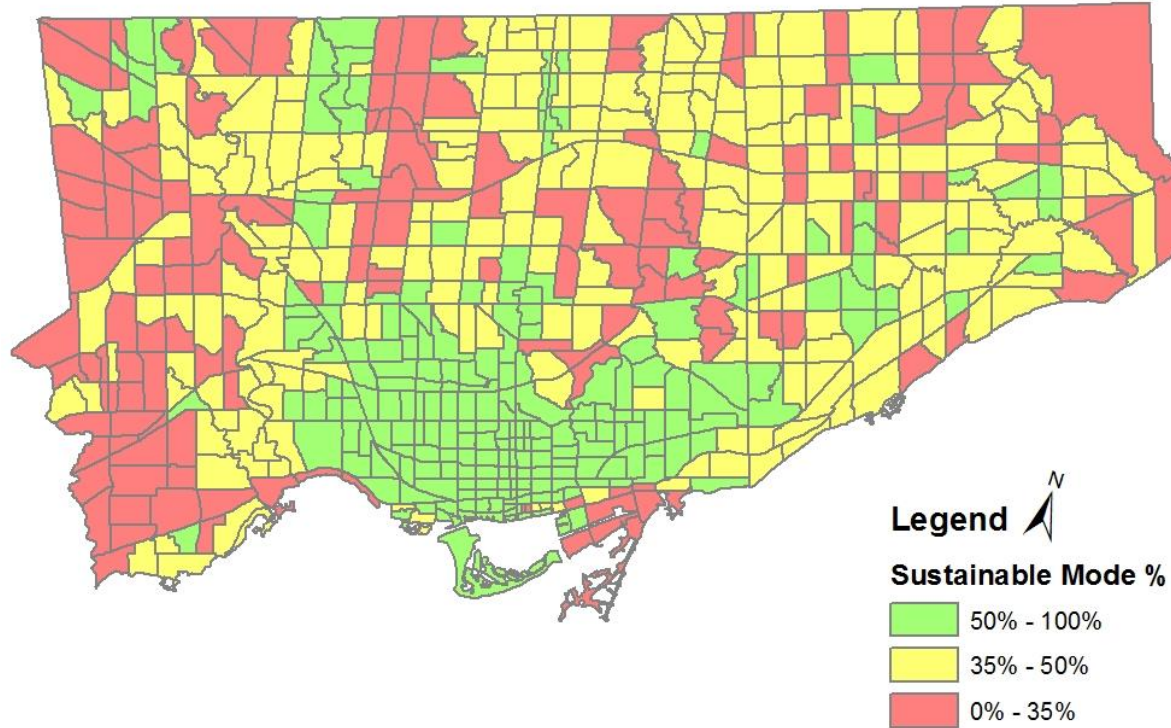
THE GTHA'S 2016 MODAL SHARES



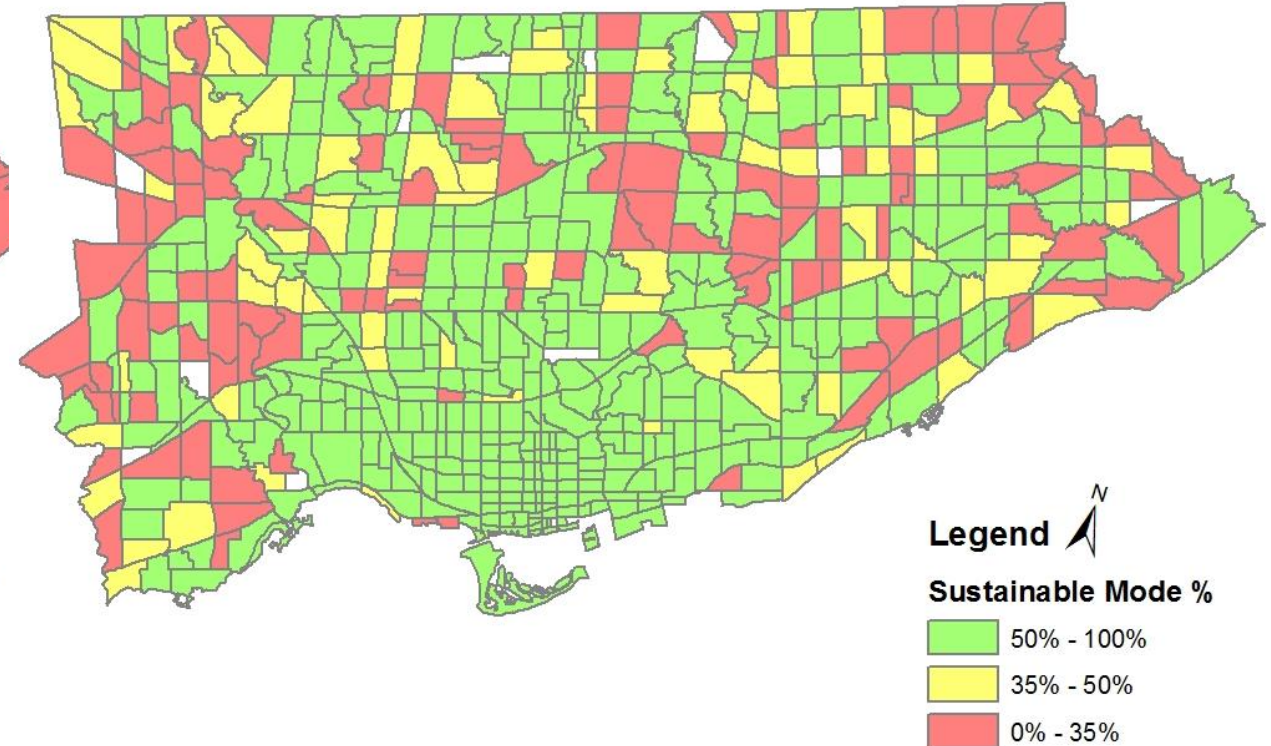
	Auto Driver	Carpool	Transit	Cycling	Walking
Toronto	47%	12%	28%	3%	11%
Durham	73%	15%	7%	0%	5%
York	71%	15%	8%	1%	5%
Peel	68%	15%	10%	1%	6%
Halton	75%	14%	5%	1%	5%
Hamilton	70%	15%	8%	1%	6%



WHERE ARE OUR LARGEST OPPORTUNITIES?

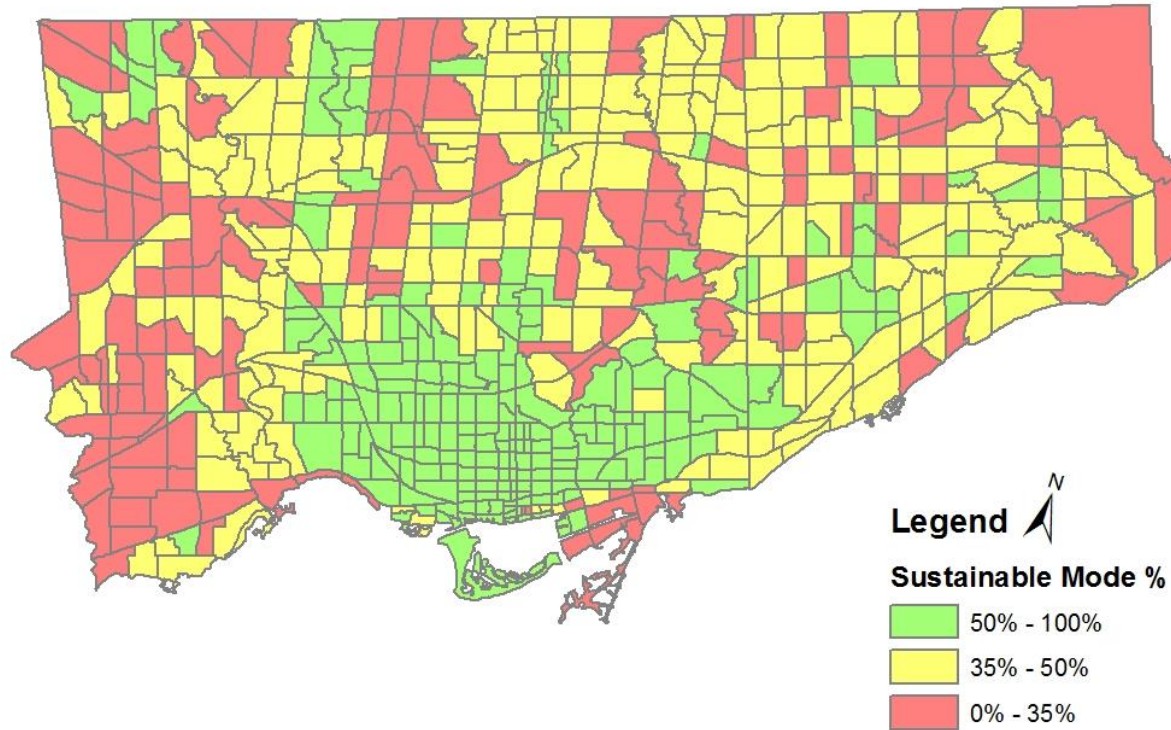


All Daily Trips

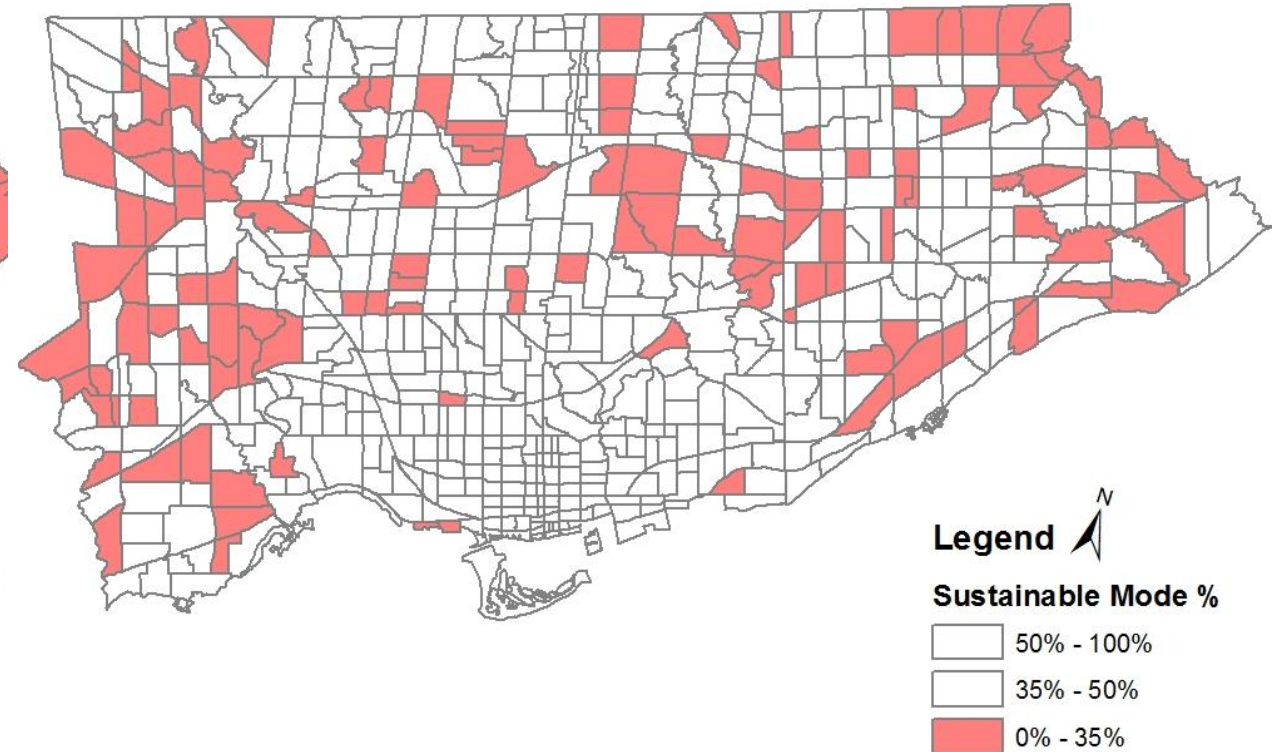


Short Distance (<2km) Work Trips

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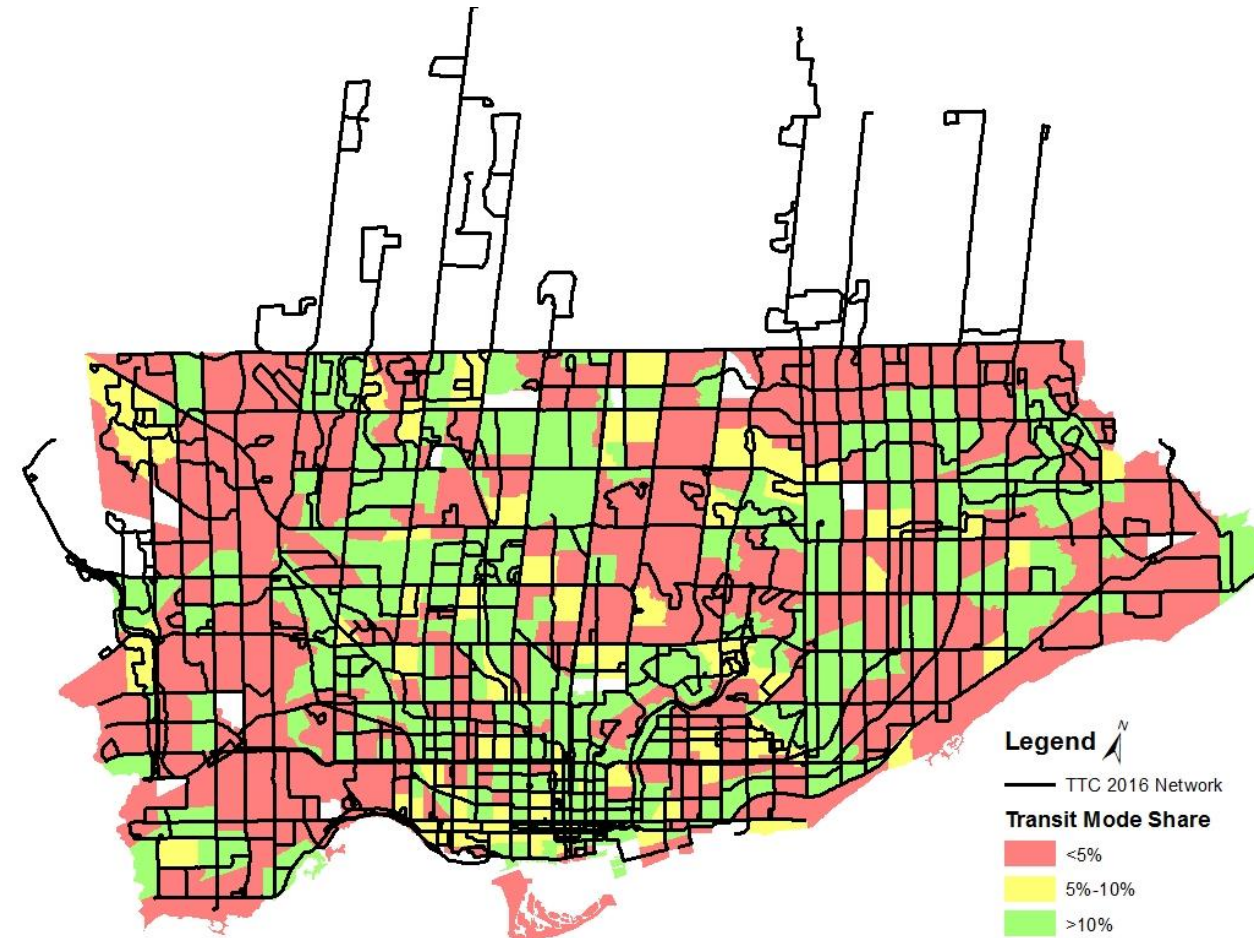


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Short Distance (<2km) Work Trips

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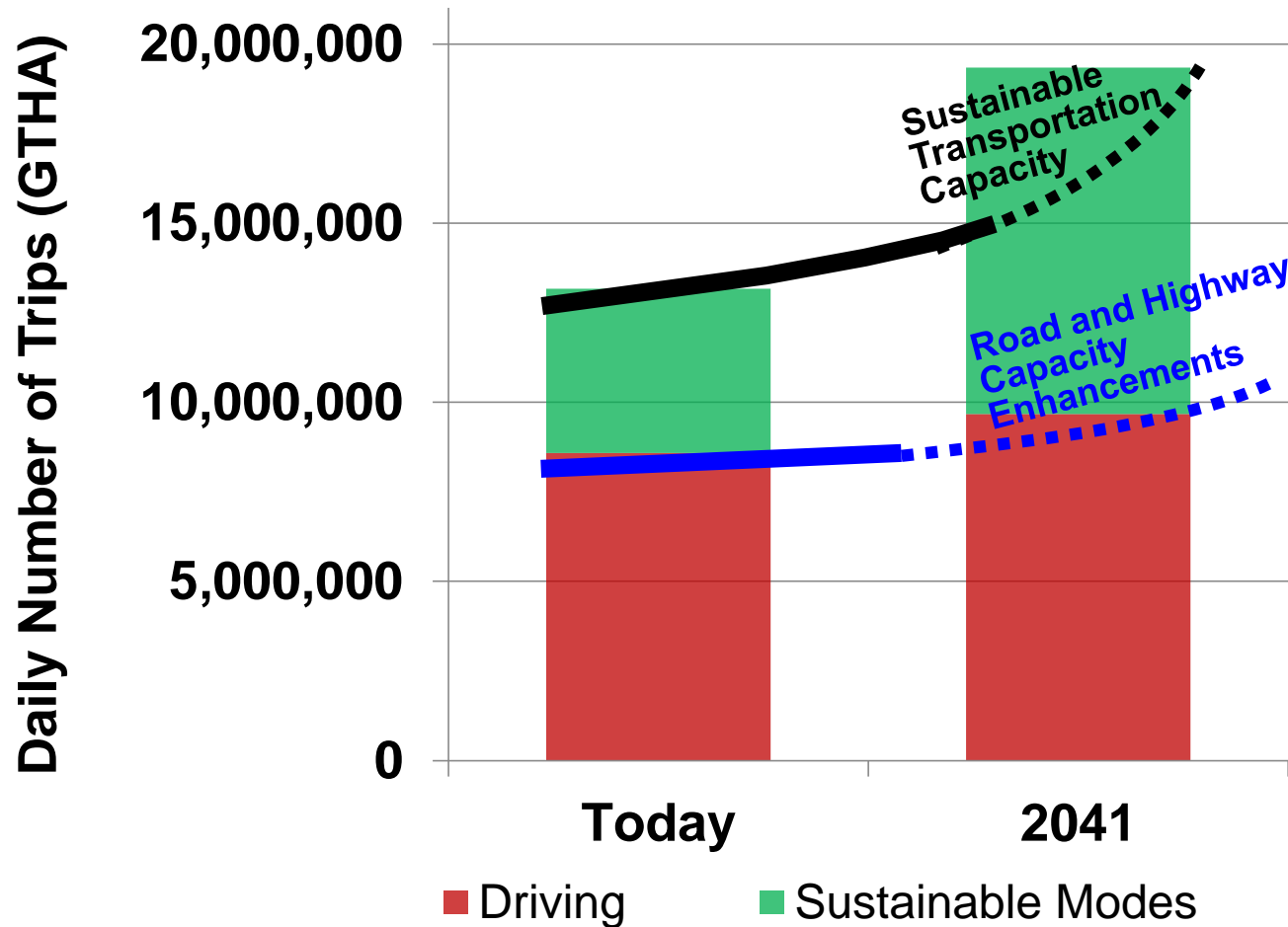


Transit Mode Share



Areas with Low Transit Usage

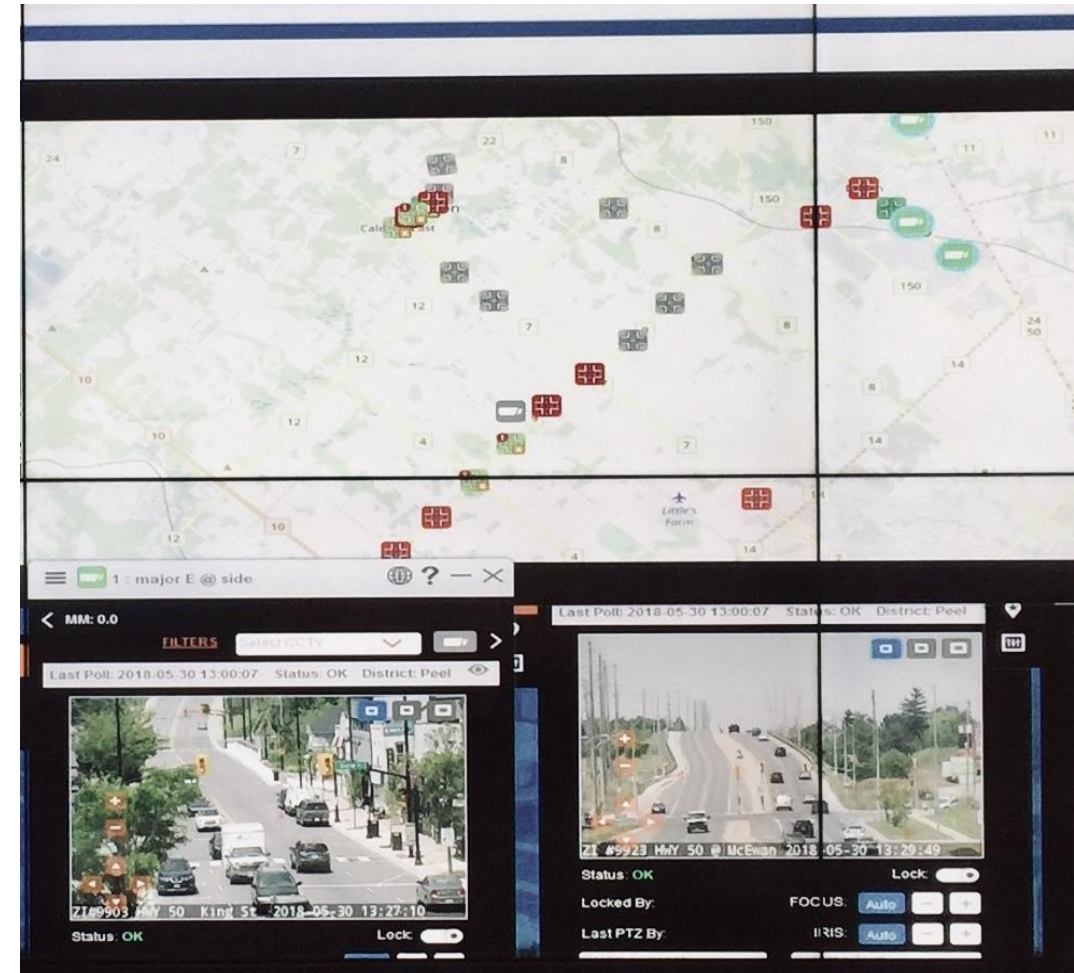
ACCOMMODATING FUTURE TRAVEL DEMAND



- Road and Highway capacity enhancements are **finite**
- Future Trips must be accommodated by increased **transit, carpool,** and **active transportation**
 - 50% sustainable mode share target is commonly accepted
- **Congestion** will still get **worse**, because of the increased number of trips

REDUCING CONGESTION

- Increase **Supply**
 - Conventional Approach
 - Road expansion, New freeways
 - Transit + Active Transportation Facilities
- Manage **Demand**
 - Spatial and Temporal Adjustments
 - Route Optimization
 - Ridesharing (e.g. Uber)
 - Adjusting work hours
 - Congestion Tax
- Can also accomplish the above by using **Intelligence (ITS)**



HOW CAN WE PRIORITIZE INVESTMENTS AND INITIATIVES?

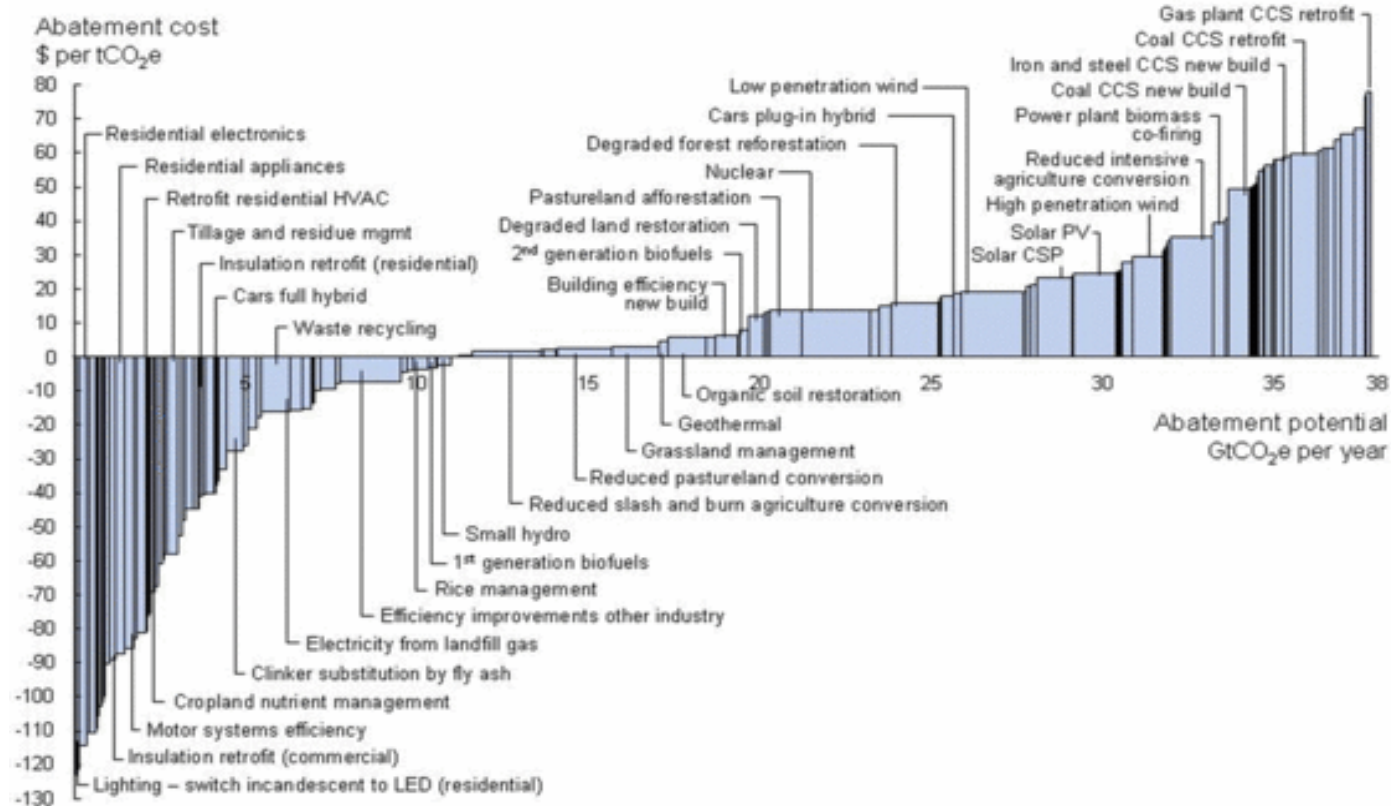
- There are several investments that can be made to **reduce congestion**:
 - Transit Service and Facilities
 - Highway and Road Capacity
 - Technological Investments
 - Promotion of Active Transportation



THE MARGINAL ABATEMENT COST (MAC) CURVE

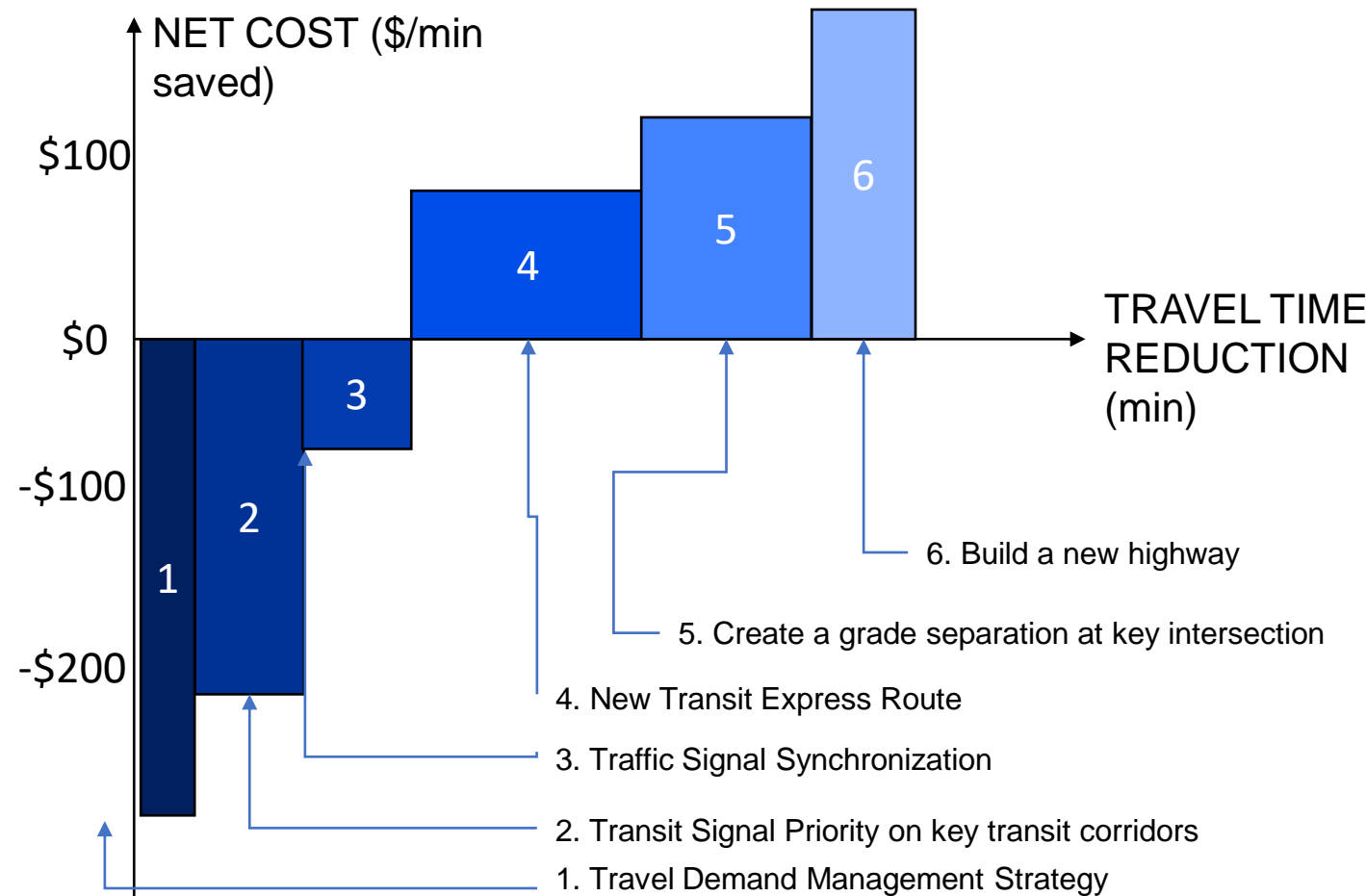
- An idea that stemmed from the climate change initiatives!
- Prioritizes initiatives based on potential and cost effectiveness
- Abatement potential (x-axis)
- Abatement cost (y-axis)

Global GHG abatement cost curve beyond business-as-usual, 2030



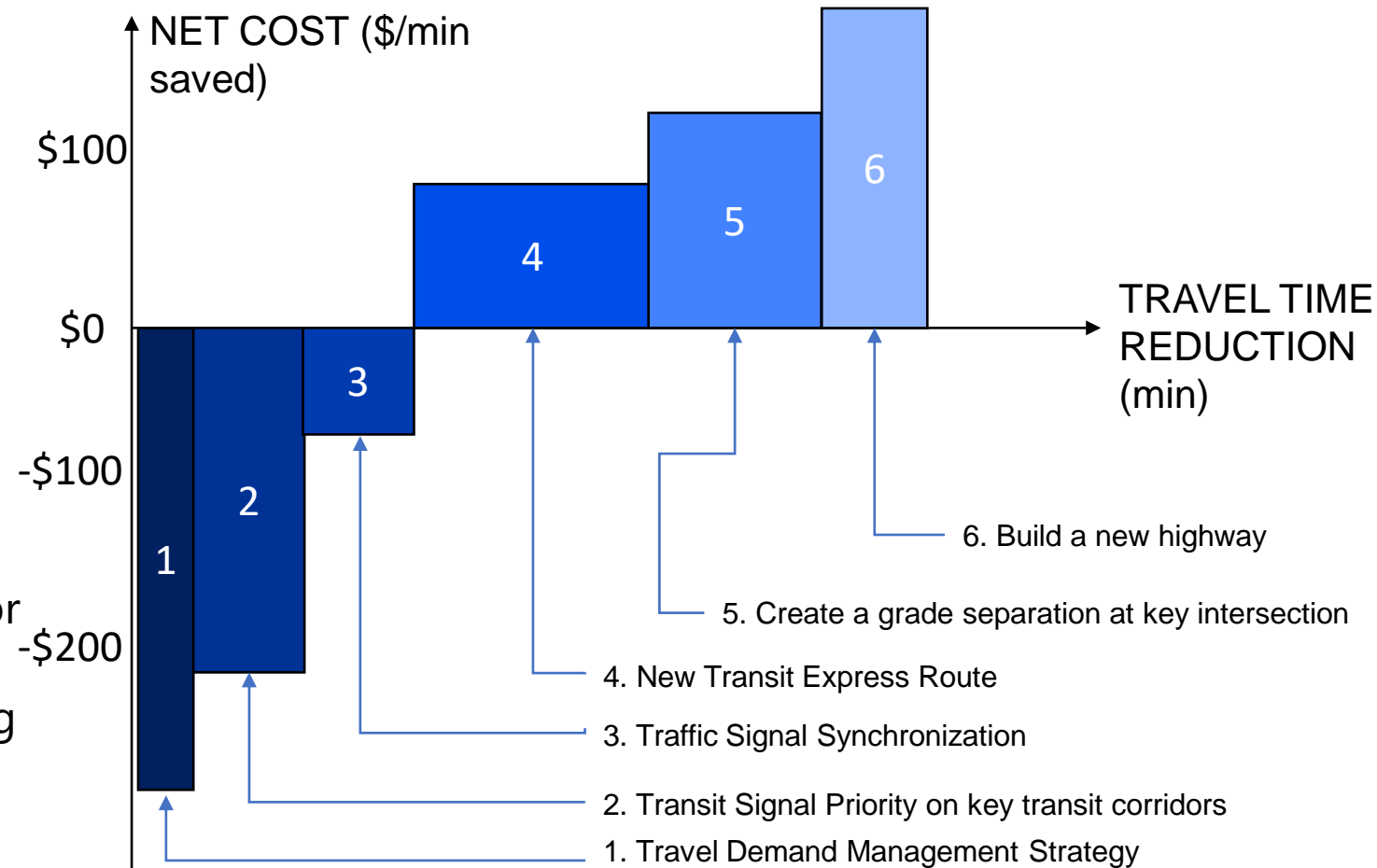
ADAPTING THE MAC CURVE FOR TRANSPORTATION INITIATIVES

- Evaluate **Marginal Improvement** of Proposed Projects
- Considers **cost-effectiveness** and **travel-time reduction**
- Variations: increase in trips by **sustainable** modes, decrease in **emissions** from vehicles, etc.
- Use **models** and **simulations** to quantify overall network travel time reduction



CHALLENGES AND DRAWBACKS

- **Quantifying** travel time reductions
 - Computationally challenging
 - Inaccuracies and variances
- Costs and benefits may not have a direct **monetary value** (ex. Carbon emission mitigation)
- Some **initiatives** are **necessary** (i.e. transit is a social service)
- **Conflicting goals:**
 - Sometimes initiative with the highest travel time reduction is unsustainable or is politically unacceptable
 - Ex. Sustainability concerns with building a new highway



ENVISIONING OPPORTUNITIES IN MULTIMODAL TRANSPORTATION PLANNING

- 1. With increased growth in population and employment, cities will see a drastic increase in the number of trips.**
2. New trips cannot all be accommodated with single-occupant driving. Multimodality is essential.
3. Congestion for the future will inevitably get worse, but needs to be mitigated as much as possible
4. We must prioritize initiatives to mitigate congestion while keeping in mind multimodality
5. Our future depends on our ability to create innovative, multimodal solutions, that are based on collaboration between different agencies, governments, and professionals.

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Thank you!

Contact

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