

# Transportation

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Why are we here?



Why are we here?

I am here because you are  
here.

You are here because I am  
here.

But why at the State Office  
Building ?

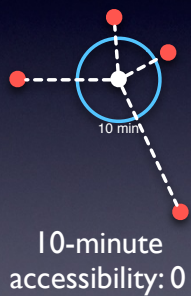
To be able to **access** the best  
policy ideas in Minnesota.

Transportation is about  
connecting people to destinations

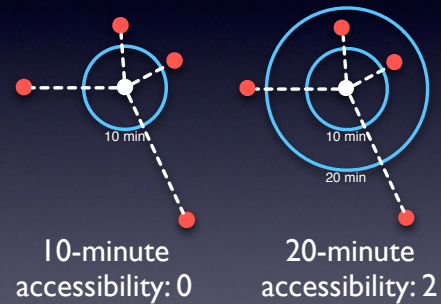
It is not (only) about congestion or speed of travel

It is also about connectivity and where things are

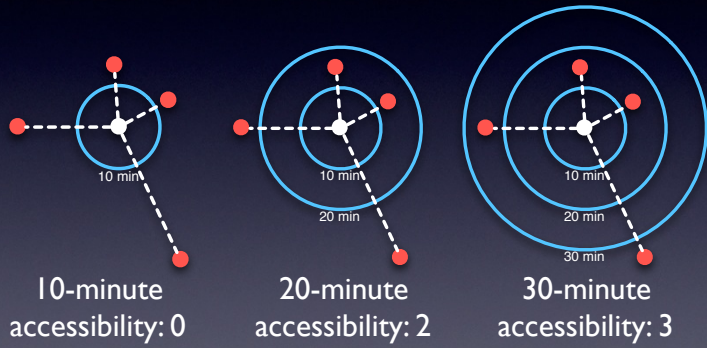
## Cumulative Opportunities



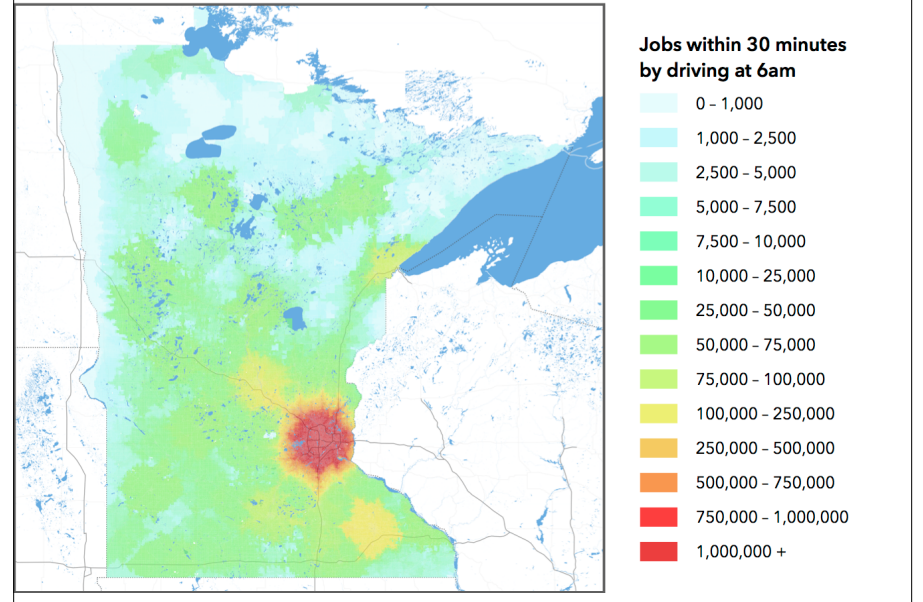
## Cumulative Opportunities



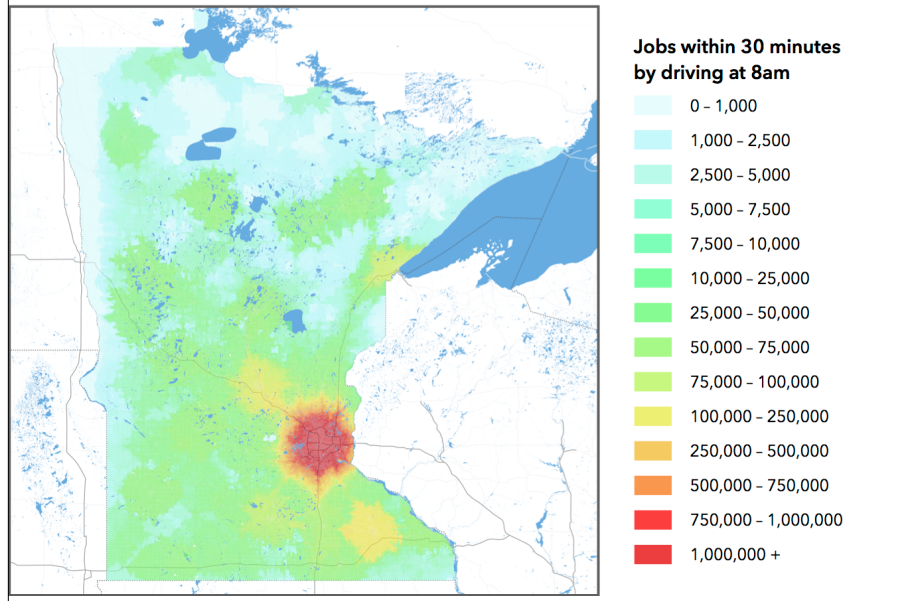
# Cumulative Opportunities



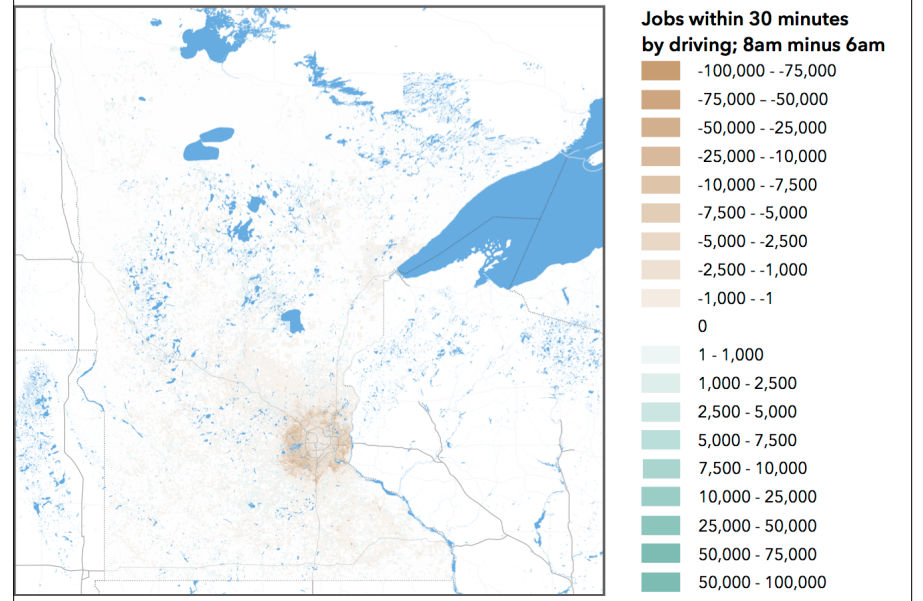
## Minnesota

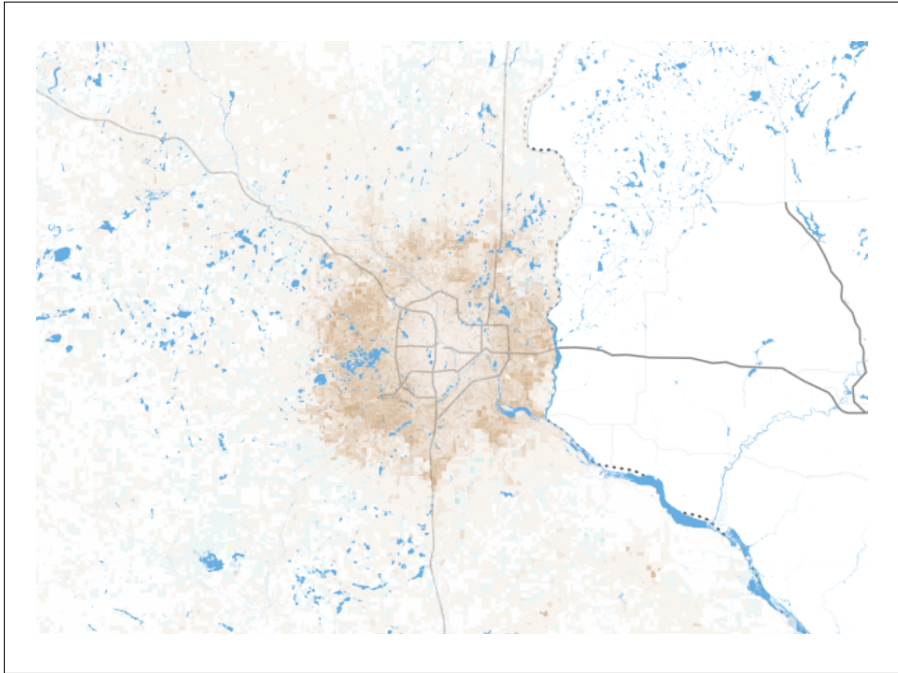


## Minnesota



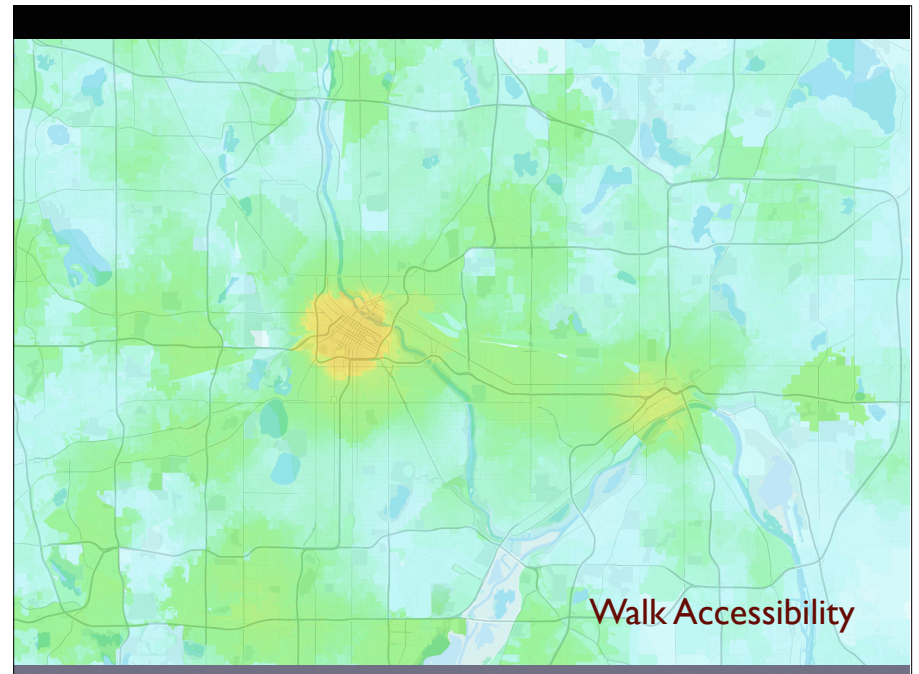
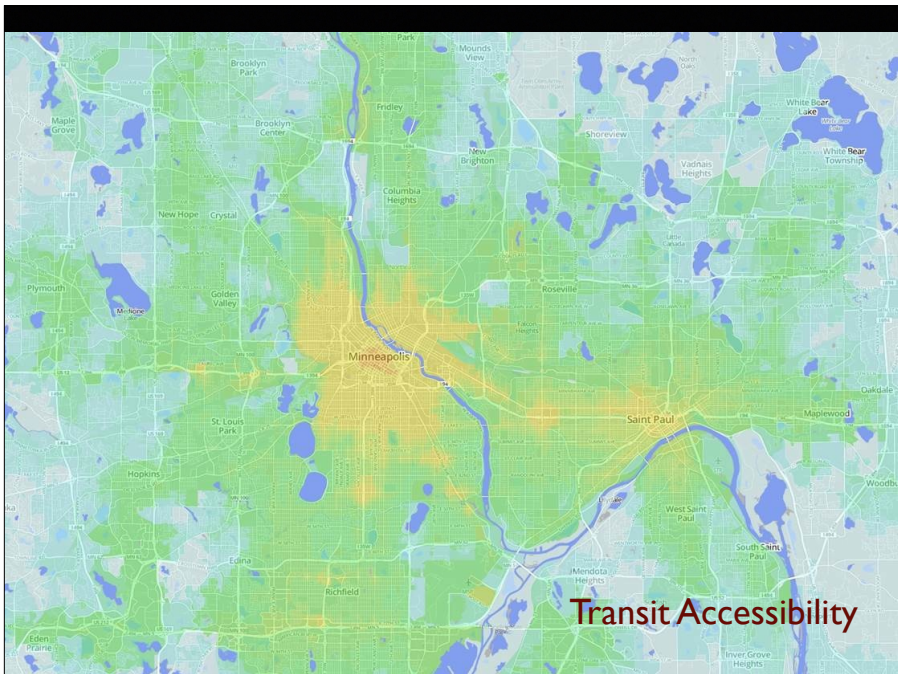
## Minnesota





This applies across any and all modes

Data from National Accessibility Evaluation conducted by Accessibility Observatory at University of Minnesota (MnDOT led project funded by 9 states and US DOT)



## Clearly access by car is higher than by transit

- So more people drive than take the bus or train.
- But many people value transit, and not just for work ...

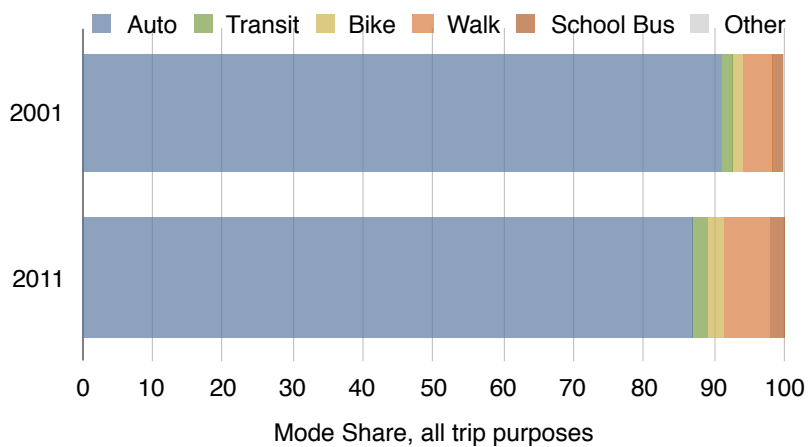
## The Transit Constituency

- MSP: Commuters Using Transit (to work): 5%
- MSP: Families using transit “sometimes, most of the time, or always” for work or school: 11%
- MSP: Families using transit for any purpose: 26%

ACS, AHS  
<http://cityobservatory.org/undercounting-the-transit-constituency-2/>

## Competing Modes

Figure 3.9 Mode Shares in Minneapolis - St. Paul Region, Summer 2001 vs. Summer 2011



## Congested cities tend to have higher accessibility

- Accessibility creates value, (which we see in land prices and wages), which causes demand, which creates traffic, which slows speed, which limits the amount of value created.
- Accessible places are more productive and attractive (otherwise why pay more to live near other people?)

# What trends are taking place?

Figure 1.1: Climbing Mount Auto

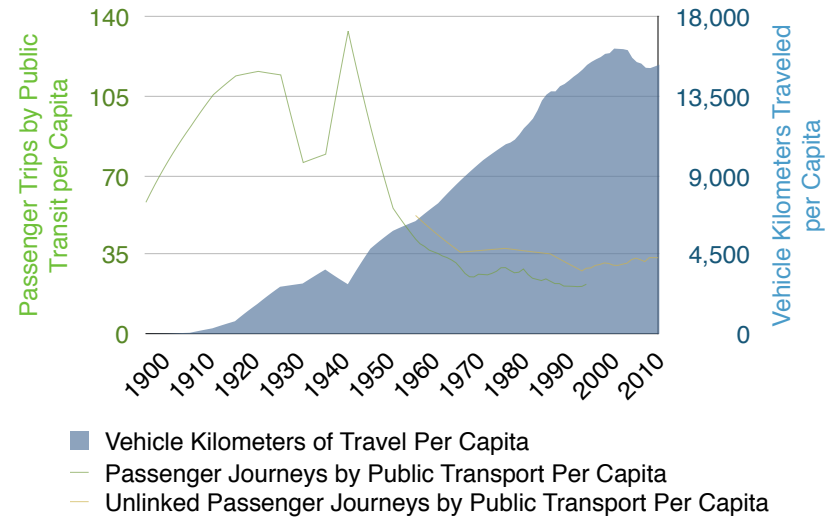


Figure 1.2 Roadways per Capita in US (m)

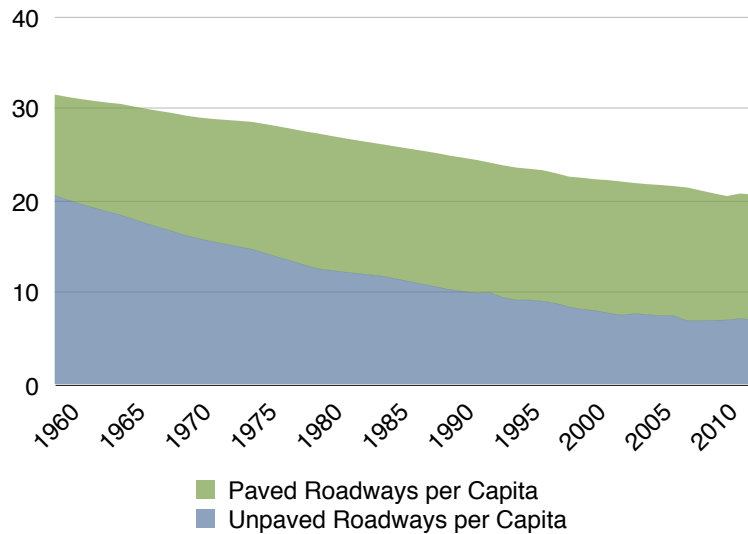


Figure 1.3 Registered motor vehicles in US

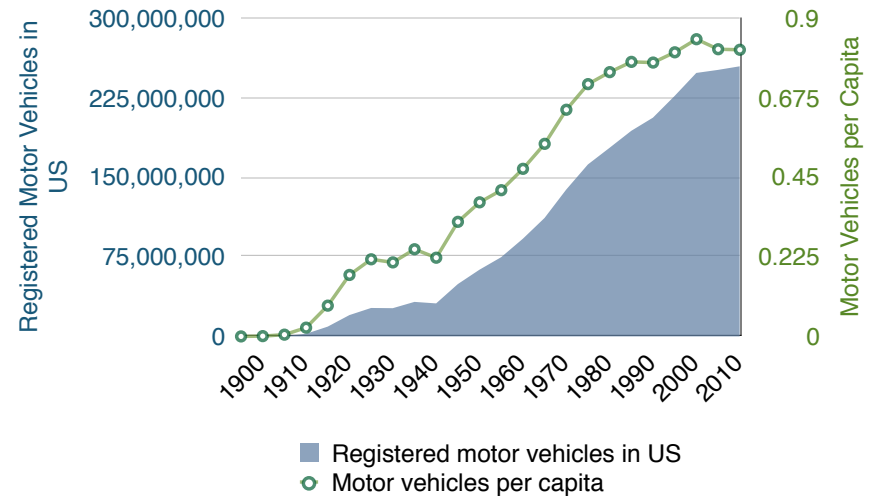


Figure 1.4 Total Time Spent Traveling per capita (minutes)

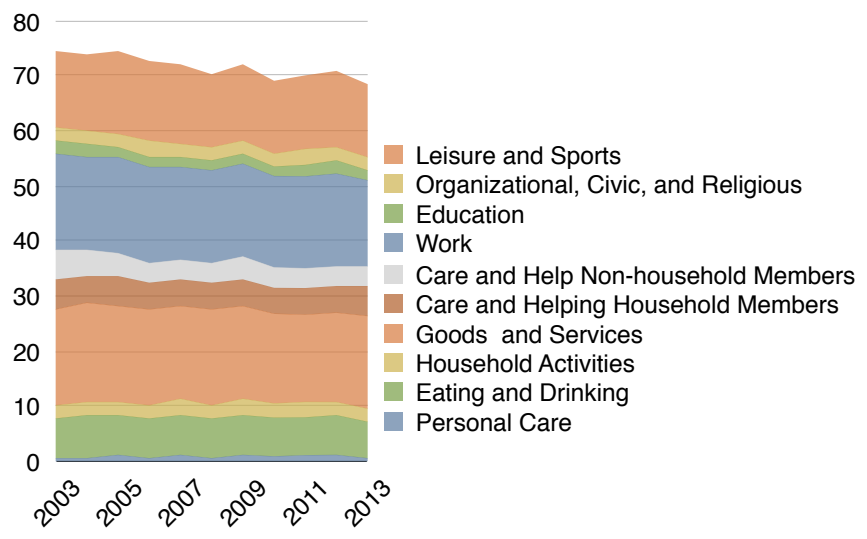
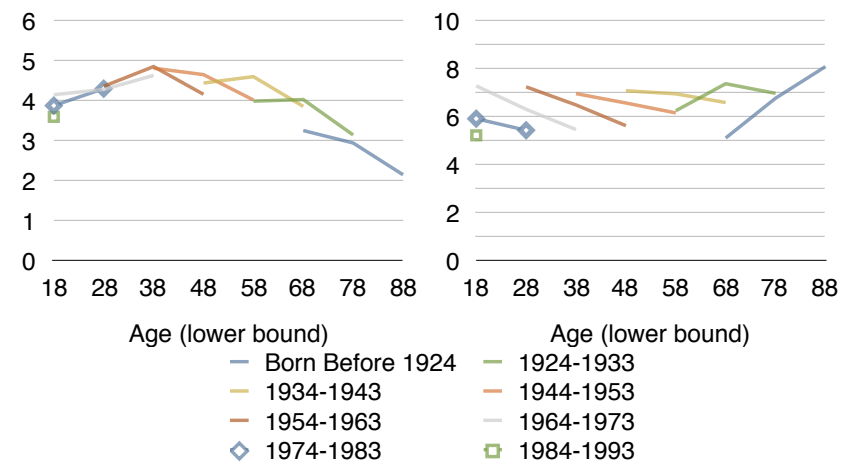


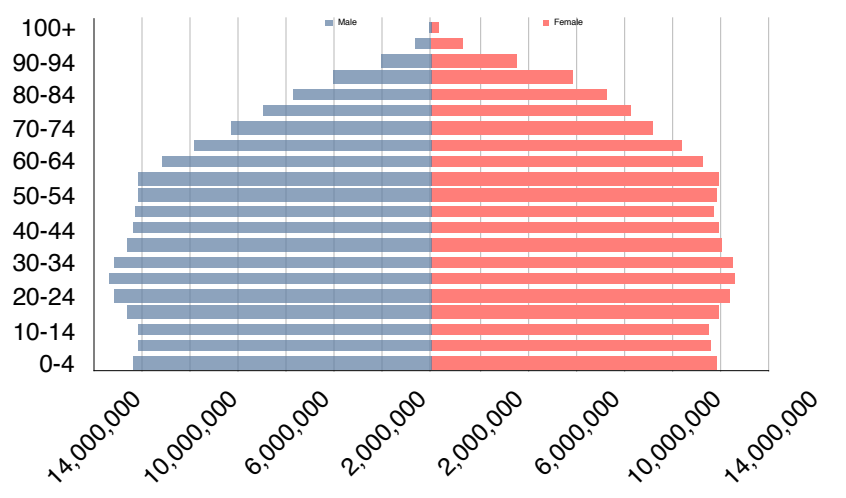
Figure 1.6 Average Trip Distance by Age and Year of Birth Cohort (Miles, All Purposes)

Figure 1.5 Person Trips per Day by Age and Year of Birth



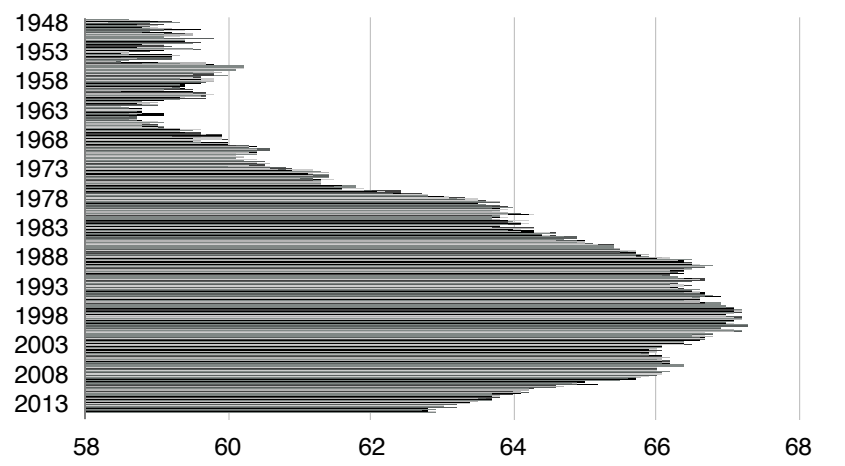
# Changing Demographics

Figure 3.1 Population of Age Groups in US 2014



# Changing Nature of Work

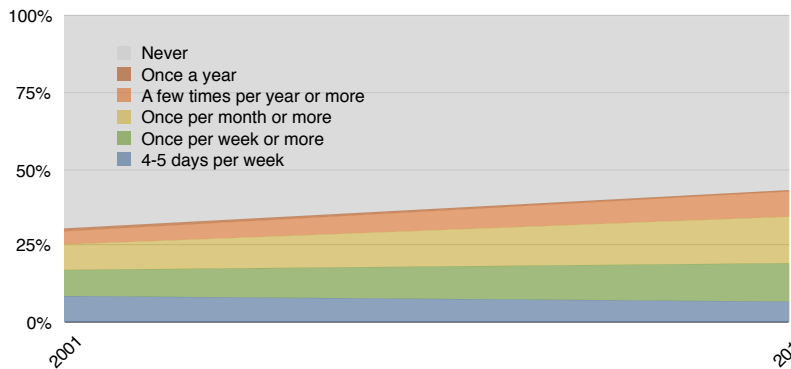
Figure 3.2 US Labor Force Participation Rate: 1948-2015



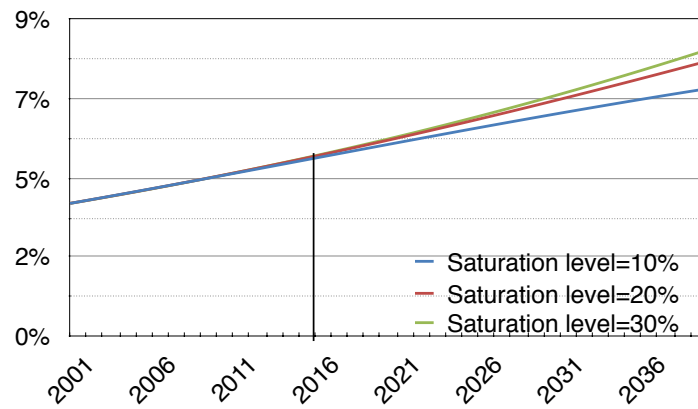


# At Home Working

Figure 3.4 Telecommuting in Minneapolis- St. Paul Region



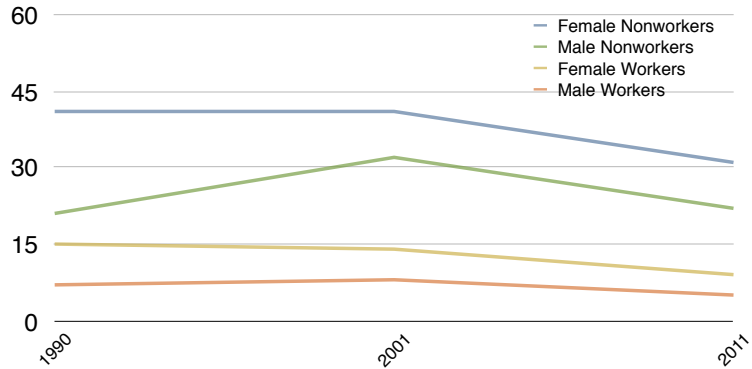
# Telecommuting Trends and Projections



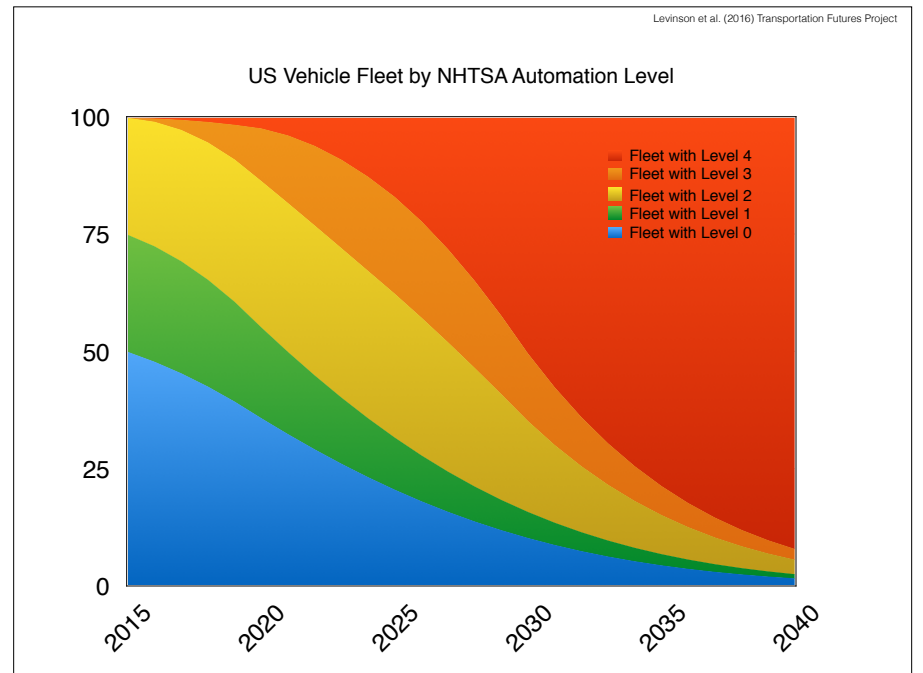
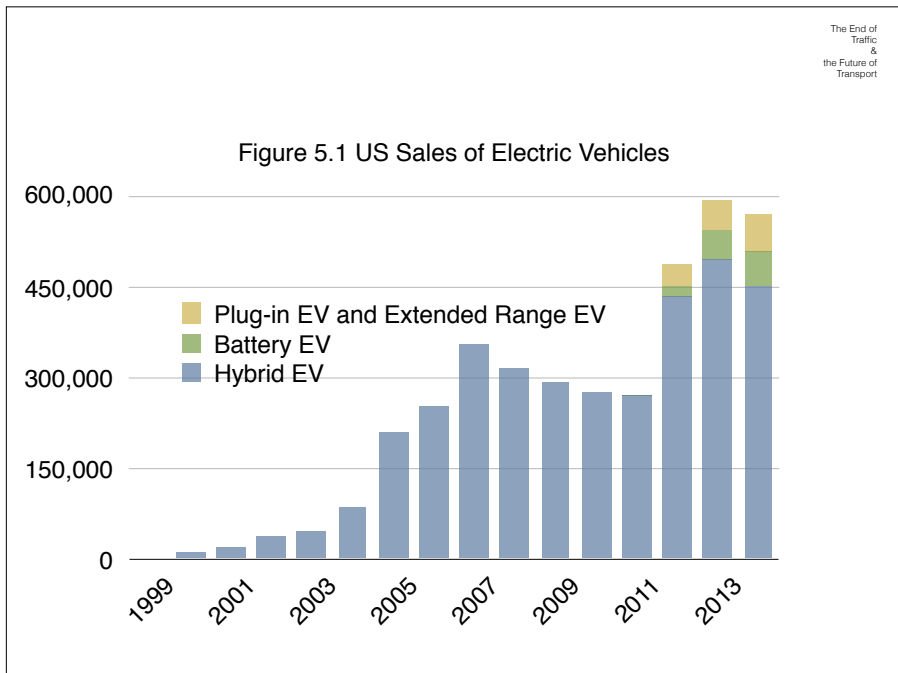
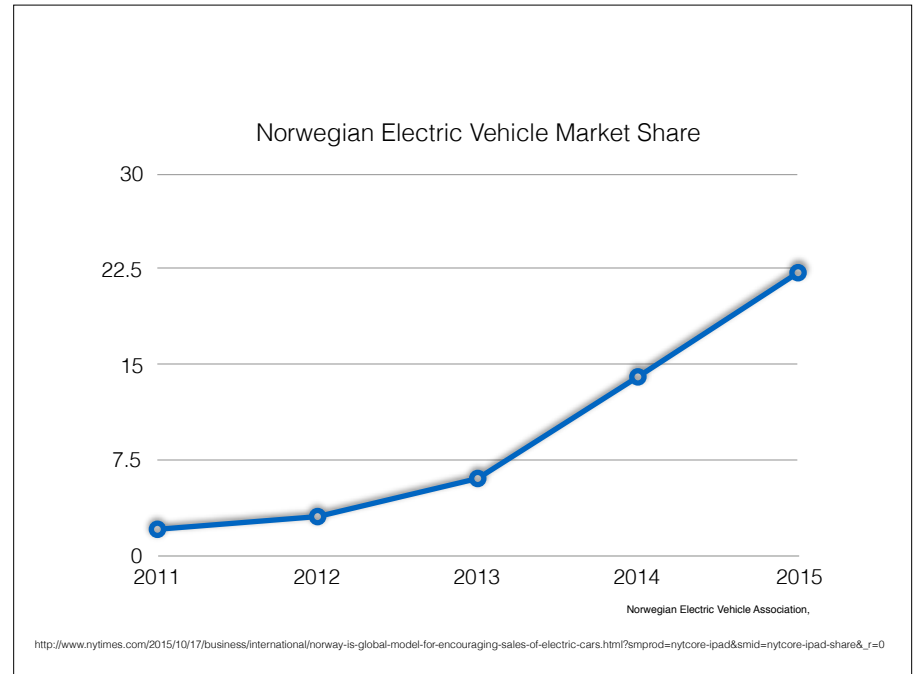
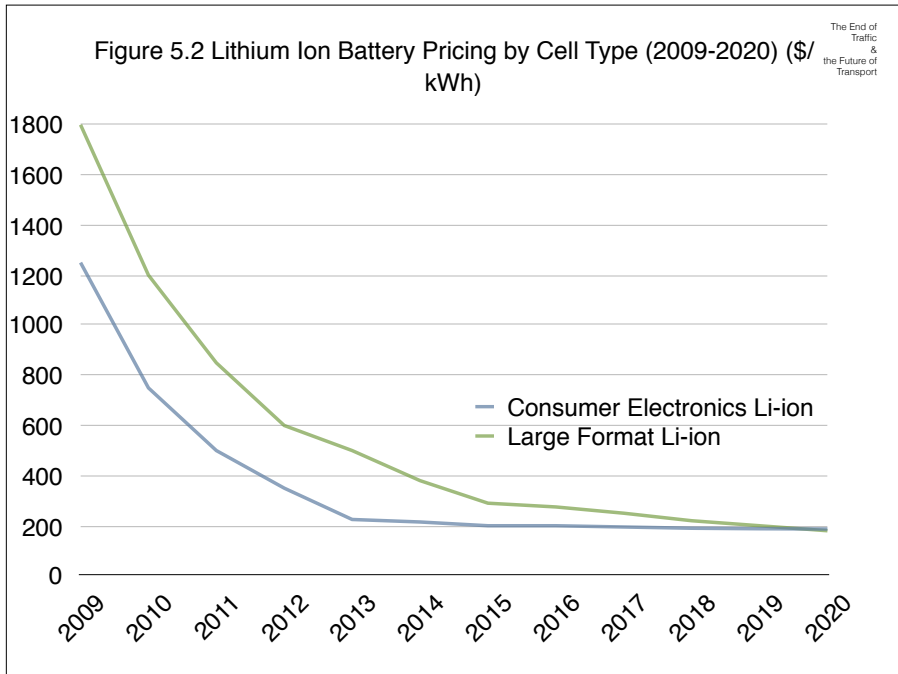
Cao 2016

# Online Shopping

Figure 3.5 Time Spent Shopping per Day in Minneapolis St. Paul Region (minutes)



# What trends are coming?



# A Cambrian Explosion of Vehicle Forms



“Google Car”

# Shape-Sifting



MIT “Stackable City Car” Concept

# Bigger



“Toyota Swagger”

# And Smaller



GM Lean Machine



Toyota iRoad



Gogoro

# with Fewer Wheels?



Ryno

## What policies can Minnesota engage in to maintain or increase access?

### 1. Preserve

- The value (benefits - costs) of preserving existing links is generally far greater than the value of new links, especially new links serving future (speculative) development (development-oriented transportation).

### 2. Reduce & Reuse

- Most roads are under-used most of the time. There is ample capacity outside the peak.
- Most of the pavement is unused even at peak times; there are large gaps between vehicles both in terms of the headway between vehicles and the lateral spacing between vehicles. Americans drive 6 foot wide cars in 12 foot lanes, often on highways with wide shoulders.
- Most seats in most cars are unoccupied most of the time.
- Most cars contain far more weight than required to safely move the passenger. While bigger cars might be safer for the occupants, they are less safe for non-occupants. This is an inefficient arms race.
- Many roads are so wide we use them for storage of vehicles most of the day.
- There is excessive delay at traffic lights, especially during off-peak periods, wasting time and space.
- Smoothing and spreading demand brings peak travel times closer to freeflow times, and thus raises accessibility.

## Policy Implication:

- Increased throughput per square meter of pavement due to Vehicle Automation (along with flattened demand) indicates fewer square meters of pavement are required.

## 3. Make investments that have high rate of return.

- The more benefits per \$ spent, the more things that can be built.
- Explicitly consider Benefits and Costs when making investments. This is hard since this requires forecasts of the future, which is changing.
- Focus on projects that most effectively expand accessibility for all, (efficiency), or for those with fewer opportunities (equity).

## Cost per Daily Passenger Mile

| Route             | Cost          | Daily Ridership | Line Length | Trip Length | Cost per Daily Rider | Cost per Daily Passenger Mile |
|-------------------|---------------|-----------------|-------------|-------------|----------------------|-------------------------------|
| Red Line          | 112,000,000   | 800             | 16          | 12          | 140,000              | 11,667                        |
| Northstar         | 317,000,000   | 2,400           | 40          | 24          | 132,083              | 5,503                         |
| SW LRT            | 1,820,000,000 | 30,000          | 12          | 4.7         | 60,667               | 12,908                        |
| Green Line        | 920,000,000   | 42,170          | 11          | 4.7         | 21,816               | 4,642                         |
| Blue Line         | 715,000,000   | 34,000          | 12.3        | 4.7         | 21,029               | 4,474                         |
| A-Line (Snelling) | 25,000,000    | 3,500           | 10.3        | 3.9         | 7,143                | 1,832                         |

<https://transportationist.org/2013/07/26/cost-per-daily-passenger-mile/>

## 4. Make investments that are flexible and adaptable.

- The next 50 years are going to see far more change than the past 50 years in transportation.
- Locking into investments serving today's (yesterday's) needs will lead to future stranded investments and fewer resources to improve accessibility tomorrow.

## 5. Allow local governments more autonomy in funding transit with their own money

- If a Minnesota City or County wants to tax itself to pay for something that is locally beneficial, this is nobody else's problem.
- Let a thousand flowers (or at least 87) bloom.

## 6. Accelerate the End of Congestion (and fund roads) via Pricing

## Today's gas tax (which is better than many alternatives) does not

- account for cost inflation in the road sector.
- account for rising fuel efficiency.
- pay for local roads (which are paid for by property taxes mostly).
- pay for the full cost of pollution (which is offloaded to the health sector).
- pay for crashes, which are borne individually through worsened health and life outcomes, and socially through the health care system.
- raise revenue from vehicles that do not use gasoline for fuel.
- recover pavement damage from heavy vehicles.
- address congestion, which requires time of day differentiation. Traffic congestion is a problem. It is not getting measurably worse over the past decade, but it is not getting obviously better. Even if traffic reduces in the aggregate, it won't disappear to zero in the next decade. Congestion reduces accessibility.

## Fix the Gas Tax

- Replace the local property tax share and other state and local general revenue (so-called dedicated revenue) like Motor Vehicle Sales Tax with a user fee.
- This means a Higher Gas/Diesel Tax (User Fee) for Gasoline/Diesel powered cars and trucks and **Lower Property Taxes**.
- Return the new revenue back to local governments.
- A Distance/Time-based Fee for Electric Vehicles

# Phase in a replacement?

- EVs don't pay gas tax, yet use roads.
- Retaining the highway user fee principle requires charging EVs once a sufficient number make it relevant.
- Vary vehicle mileage charge for EVs and opt-ins (and eventually all vehicles) by location and time-of-day.
- As more and more users drive EVs, this becomes the standard over time, without riots in your districts.

# Thank You

- Questions???
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