Developing Low Carbon Urban Transportation Policies

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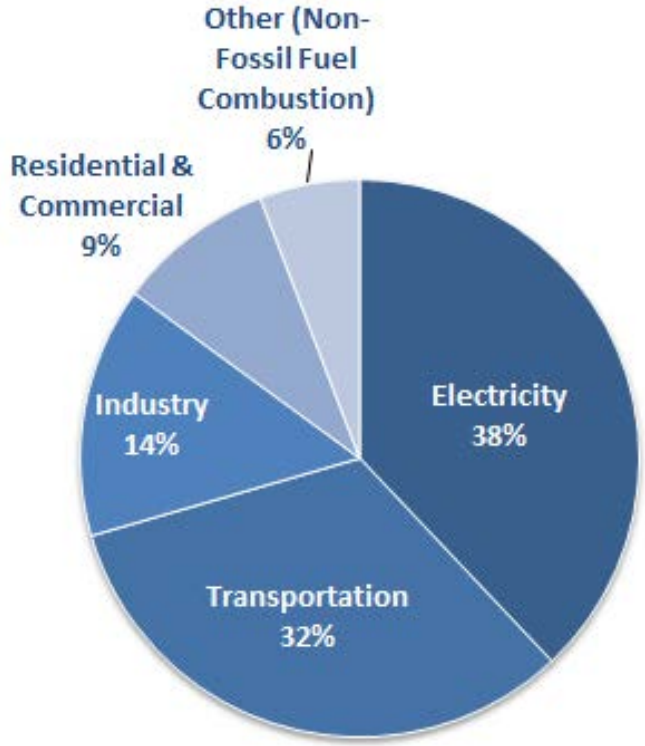
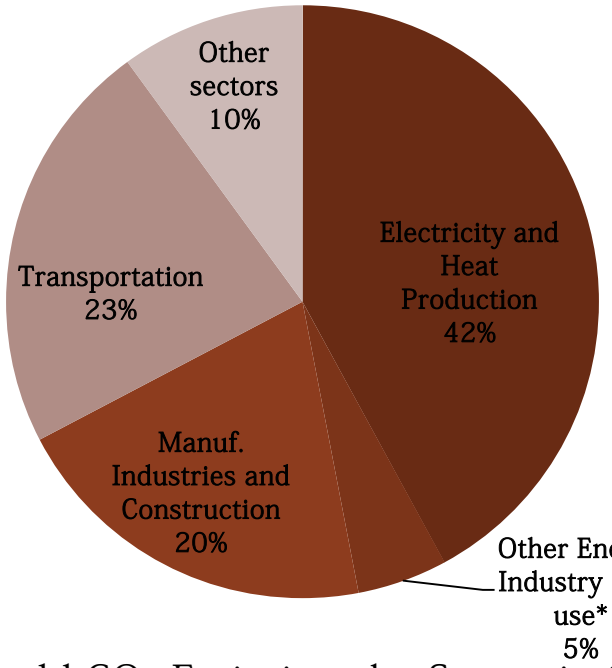
CO_2 Emissions by Sector



U.S. CO_2 Emissions by Sector in 2012

Source: Inventory of U.S. GHG Emissions and Sinks: 1990-2012

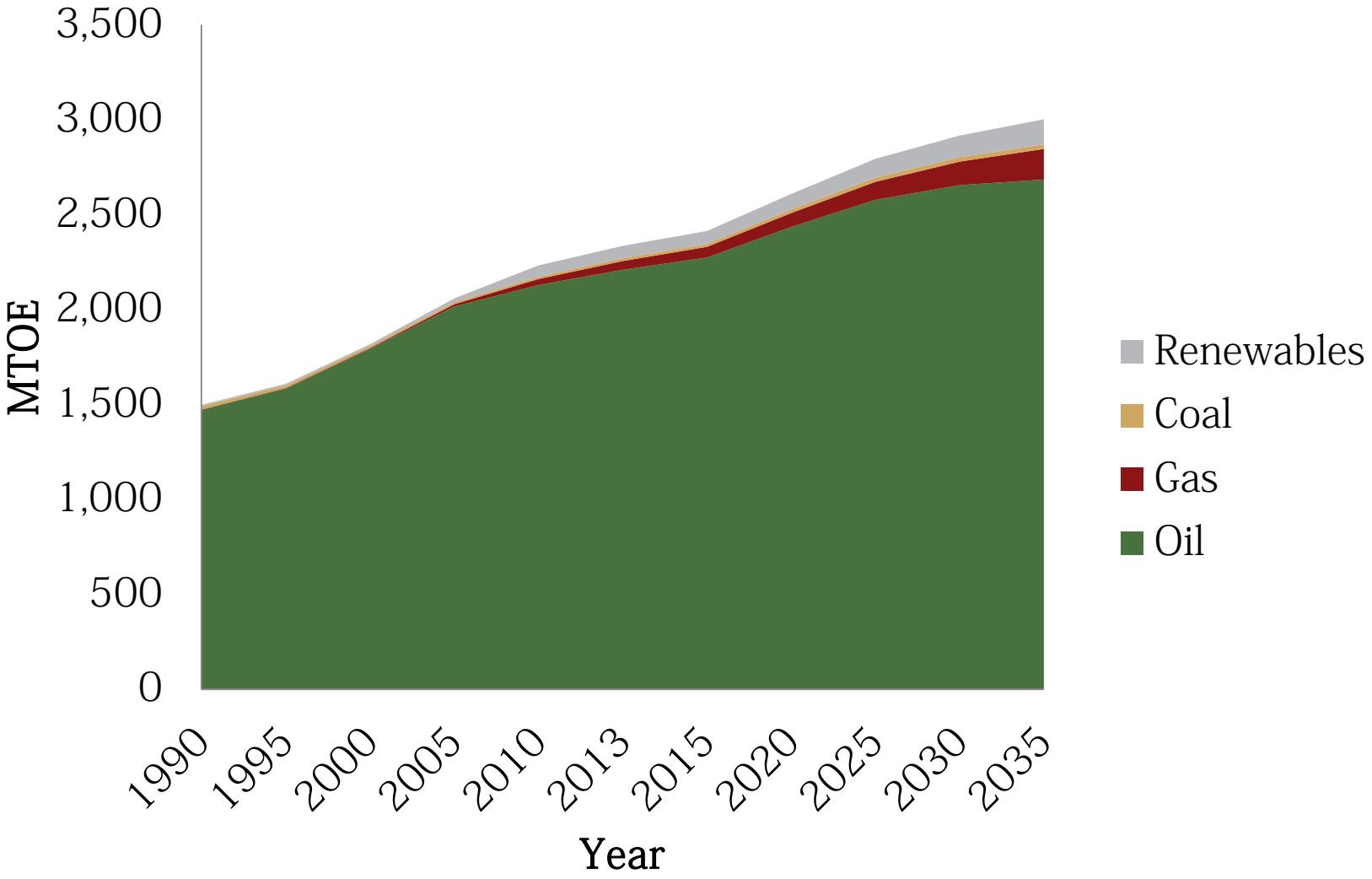


World CO_2 Emissions by Sector in 2012

Source: IEA, 2014

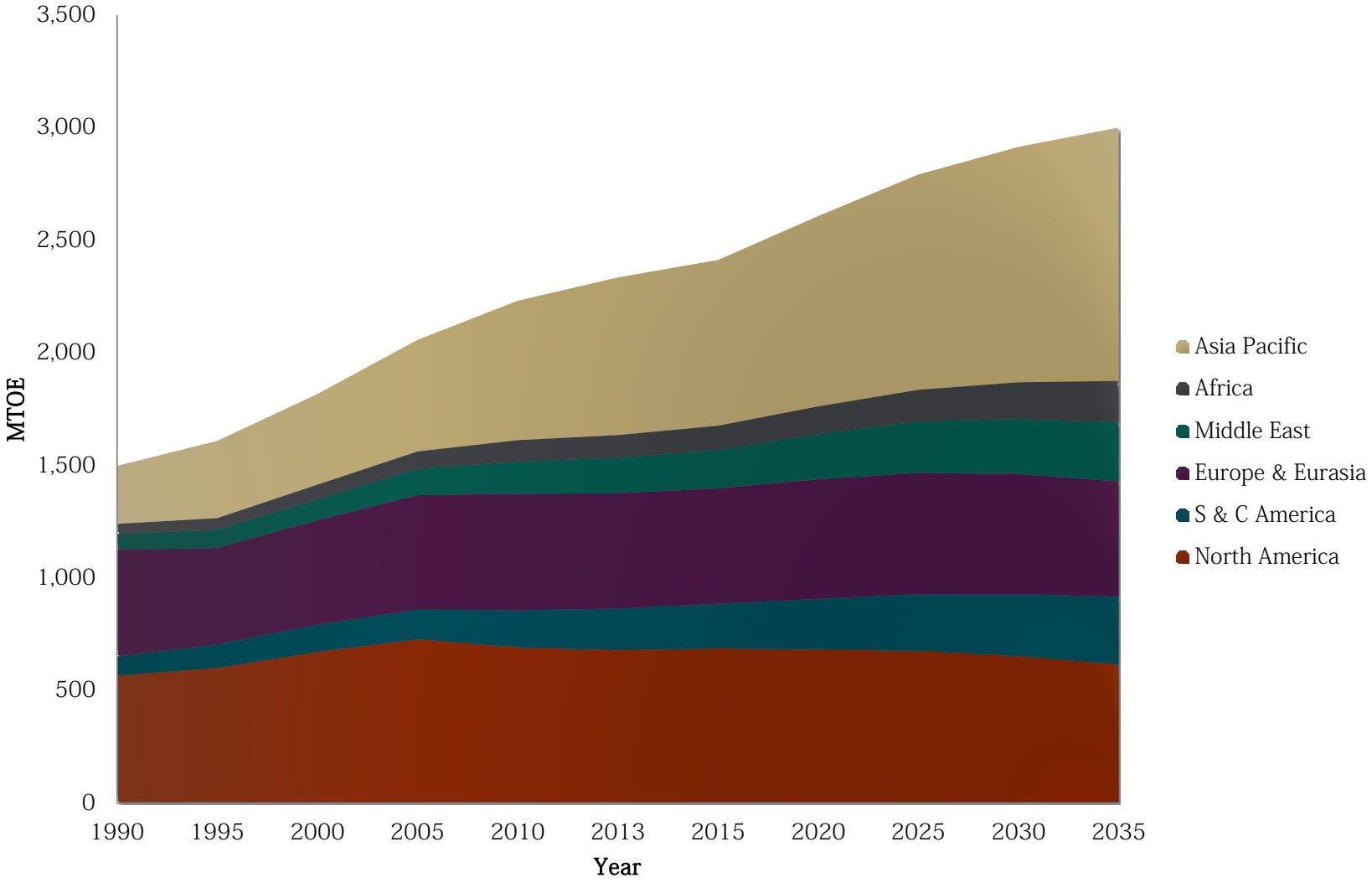
* Includes emissions from own use in petroleum refining, the manufacture of solid fuels, coal mining, oil and gas extraction and other energy-producing industries.

Transportation Energy Demand by Fuel



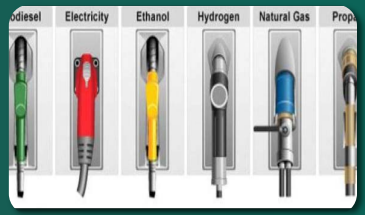
Data Source: BP World Energy Outlook 2035 (2015)

Transportation Energy Demand by Region



Data Source: BP World Energy Outlook 2035 (2015)

Achieving Low Carbon Transportation Systems



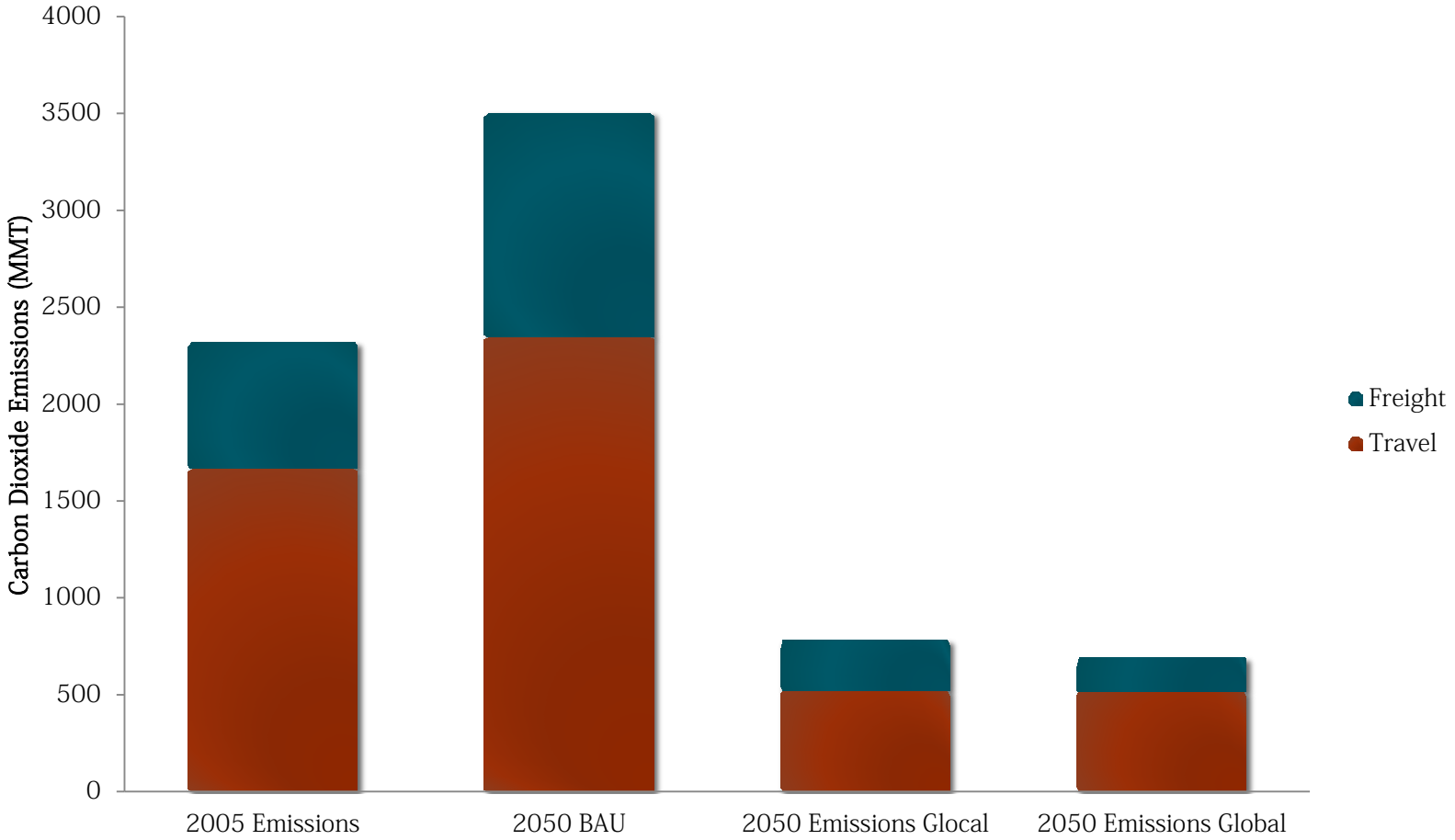
Low Carbon Fuels

Advanced Vehicle Technology

Increase Low Carbon Travel Activity

Transportation and Land Use Planning

Projections of Transportation Emissions in North America – Carbon 2050 (Schipper, Ng, Gould, and Deakin, 2010)



Glocalization: Local transportation concerns lower distance traveled and create modal shifts, through significant changes in land use and transportation planning.

Globalization: Strong international cooperation to decrease CO_2 emissions leads to innovations in vehicle technologies and stricter standards.

Policy Assumptions – Carbon 2050

Transportation Technologies and Strategies

- Fuel economy standards
- Advanced vehicle technology
- Alternative transportation fuels
- Intelligent transportation systems

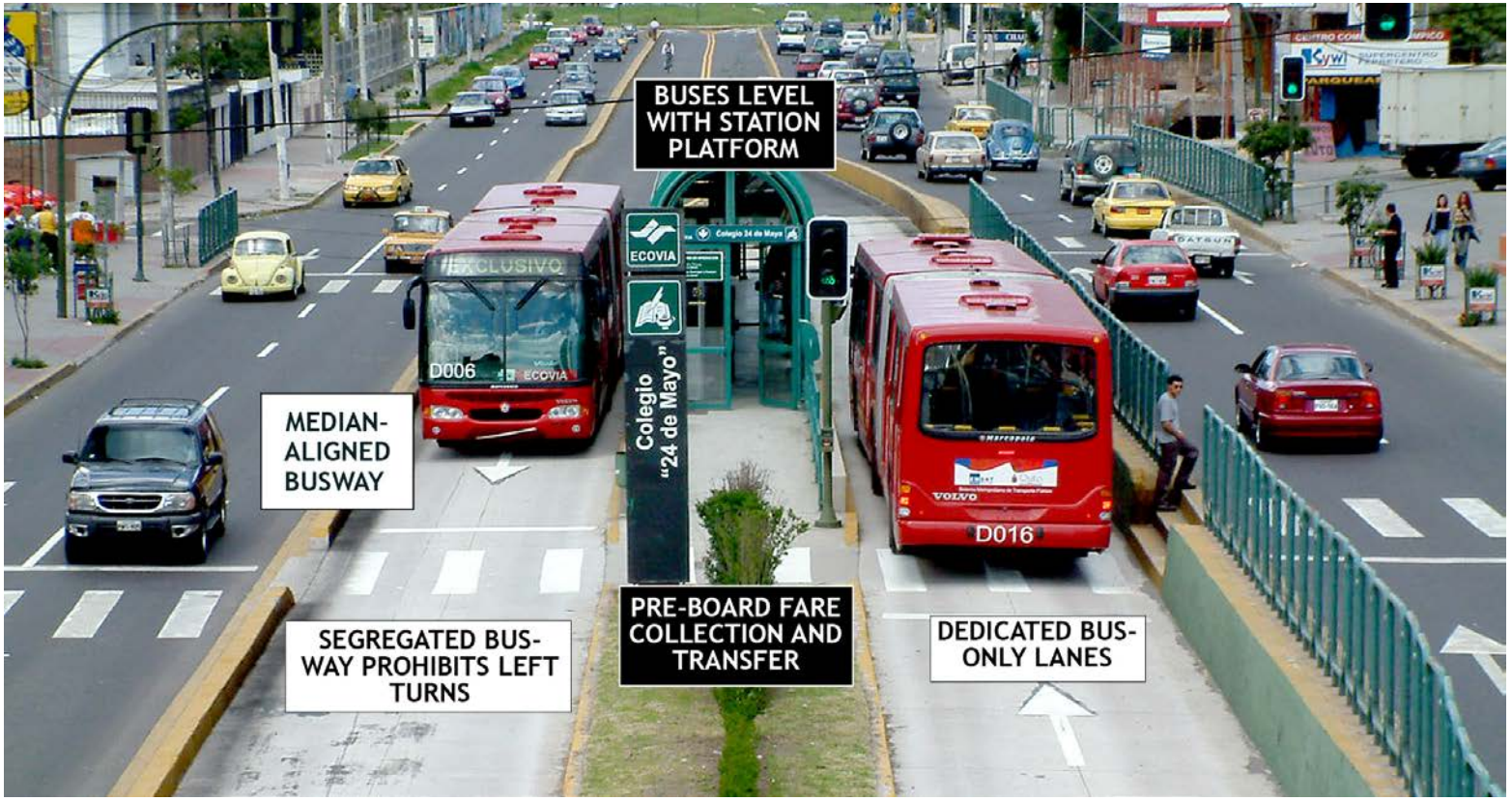
Land Use Planning and Transit

- Public transportation investment
- Transit-oriented development
- Jobs-housing balance
- Urban design

Pricing Instruments

- Fuel and vehicle taxation
- Carbon emission taxation
- Congestion pricing scheme
- Parking pricing strategies

Bus Rapid Transit (BRT) Systems



Quito, Ecuador (Photo: ITDP, 2015)

Other Characteristics

- High speed, high capacity bus service
- Can be implemented quickly, incrementally, and flexibly
- Less costly than light rail and freeway expansion
- Image and branding

Smart Parking

Parking Pricing Strategies

- Demand-responsive
- Variable and dynamic by block, time of day and day of the week
- Smart meters for data collection

Source: SF Park

Benefits

- Reduce cruising and congestion
- Reduce emissions
- Reduce traffic and travel time for drivers and non-drivers

Pilot Programs in Several Cities

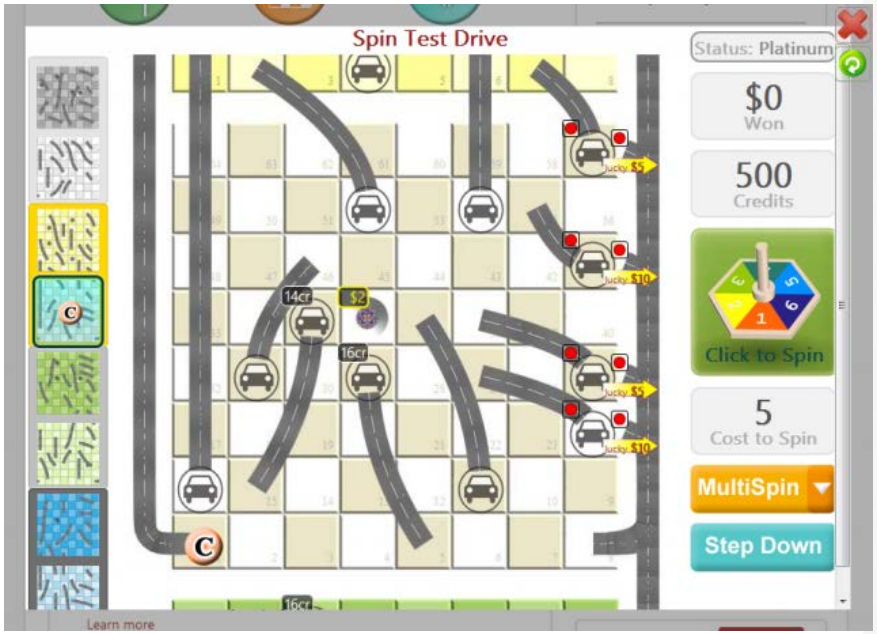
- San Francisco
- New York
- Seattle

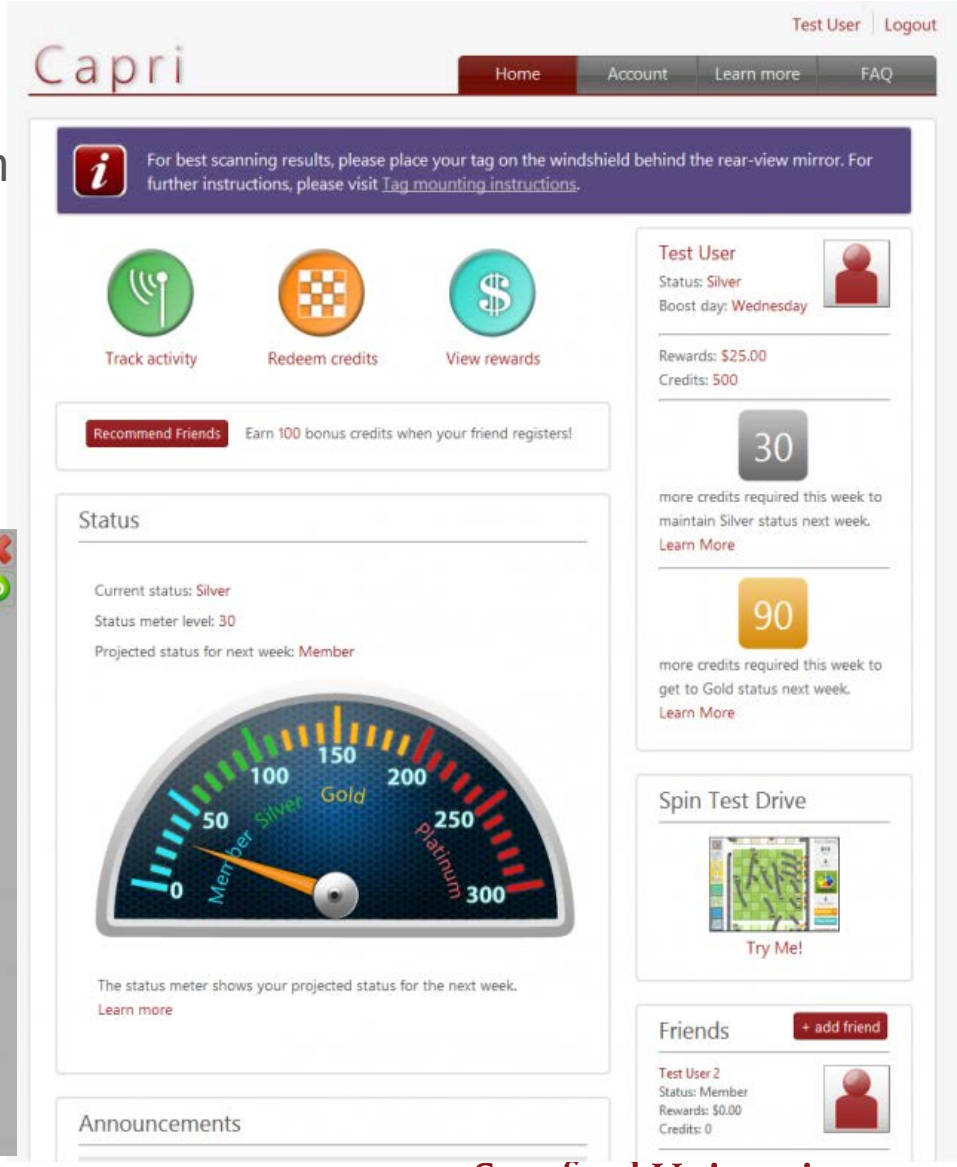
Source: Nedap Wireless Parking Sensors

Incentives and Social Interaction

Capri and Off-Peak Commuting

- Shifts people in time and space
- Participants avoid peak times to earn credits
- Redeem credits for rewards
- Cash prizes of $2 to $50





Photos: Stanford Capri

Policy Implications for Low Carbon Transportation

Changing Travel Behavior and Shifting Mode Choices

- Seamless multi-modal options
- Incentives can be more effective than penalties
- Introduce sense of social interactions (gaming and competition)
- Targeted policies for different user groups based on behavior

"Nobody wants to always drive but the alternatives are painful."
(Regular Driver, UC Berkeley Employee)