Reducing Energy Consumption Through Transportation and Land Use Strategies

Presentation on the California Energy Commission's Energy Aware Planning Guide

presented by
Ryan Greene-Roesel
Cambridge Systematics, Inc.

February 18th 2010

CAMBRIDGE SYSTEMATICS

Presentation Overview

- Overview of transportation and land use strategies in the Energy Aware Planning Guide
- Example content and effectiveness information
- Tools for estimating energy and GHG impacts

CAMBRIDGE SYSTEMATICS

Presentation Overview

- Overview of transportation and land use strategies in the Energy Aware Planning Guide
- Example content and effectiveness information
- Tools for estimating energy and GHG impacts

Energy Aware Planning Guide
Transportation and Land Use Strategies

Transportation Strategies

- Transit Fare Measures and Discounts
- Increased / Improved Transit Service
- Park-and-Ride Lots
- TDM Programs
- Transportation Management Associations
- Guaranteed Ride Home Programs
- Ridesharing
- Carsharing
- Telework
- Alternative Work Schedules
- Traffic Signal Timing

CAMBRIDGE SYSTEMATICS

Increased / Improved Transit Service

- Description
- Implementation ideas and general plan language
- Benefits / effectiveness
- Case studies

ENERGY AWARE PLANNINGGUIDE T.1.2

INCREASED TRANSIT SERVICE AND IMPROVED TRAVEL TIME

Increasing service frequency, reducing travel time, improving reliability, and modifying schedules to match service with demand are some of the most common ways to boost transit service effectiveness. While new routes are required in some instances, more often better service on existing routes will be more effective in attracting passengers. These enhancements improve the experience of passengers and make using transit more desirable when compared to solo driving. In addition to increased frequency, lowering wait times and transfers and providing customers with real-time information are service improvements that can help increase transit ridership and reduce energy consumption. Scheduling affects the waiting time customers encounter and perceive when making a transit trip. Positive benefits to passengers may include reducing wait time at the start of a trip, or during transfers if required. Scheduling changes and providing real-time information on transit arrivals can also improve passenger comprehension and allow for easier planning, which has the effect of reducing perceived wait times.

This section will outline some of the numerous ways to improve transit service and travel time, including transit system design, route planning, scheduling, roadway design, and transit information. All of these elements can affect the speed, reliability, and ease of use of a transit system.

GENERAL PLAN LANGUAGE IDEAS

» The City/County will identify a network of streets

This AC Transit stop in Berkeley provides real time transit information to passengers.

and roads where transit operates and where the City/County would like transit to operate. These transit streets will be planned and designed to support fast, reliable transit, along with pedestrians, bicycles, and other motor vehicles.

» Roadway design and signal operations and traf-

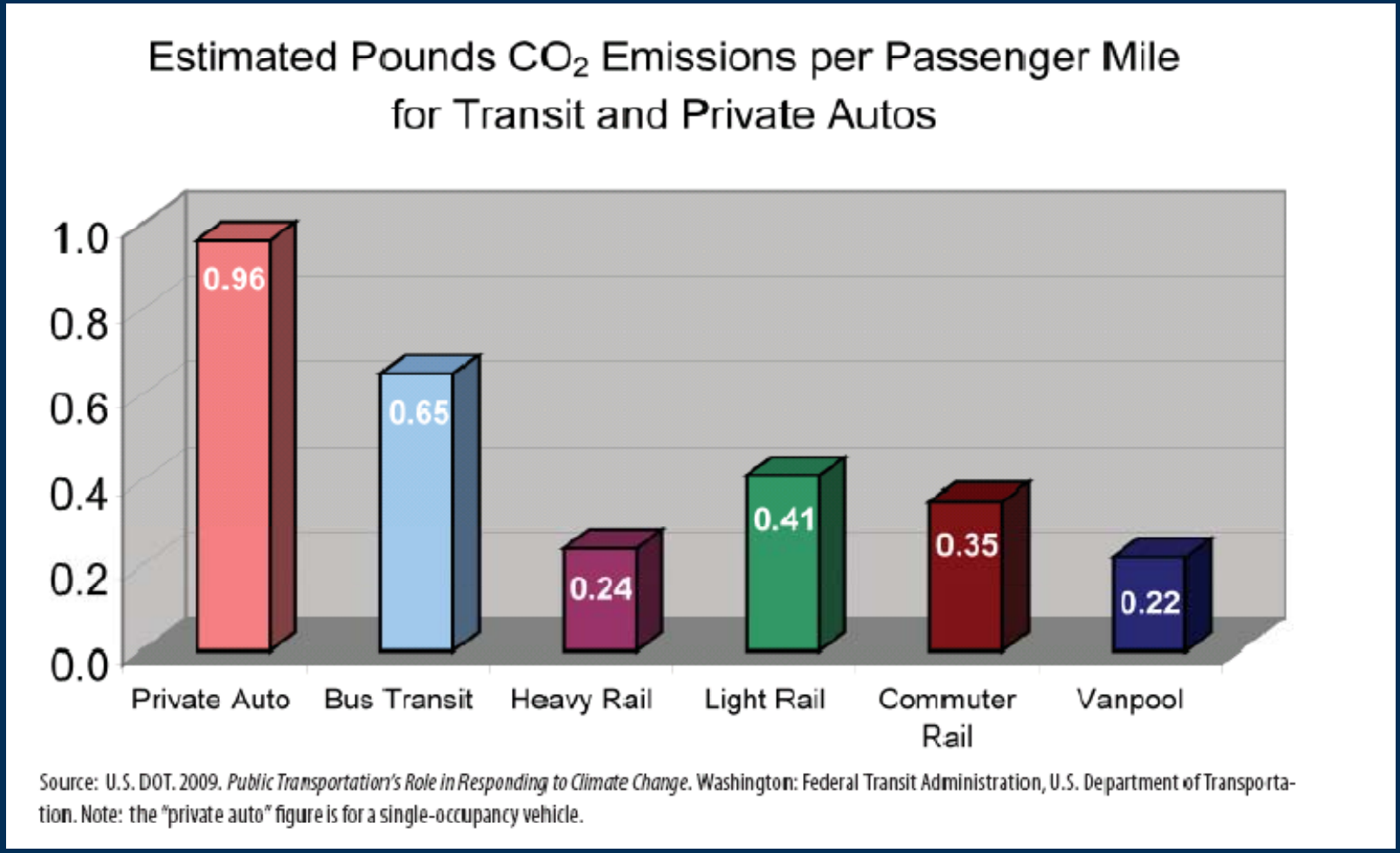
CALIFORNIA ENERGY COMMISSION T.1.2 1

CAMBRIDGE SYSTEMATICS

Sample of Implementation Ideas

- Increase service frequency
- Reduce transfers
- Transit signal priority, queue jumper lanes
- Real time information

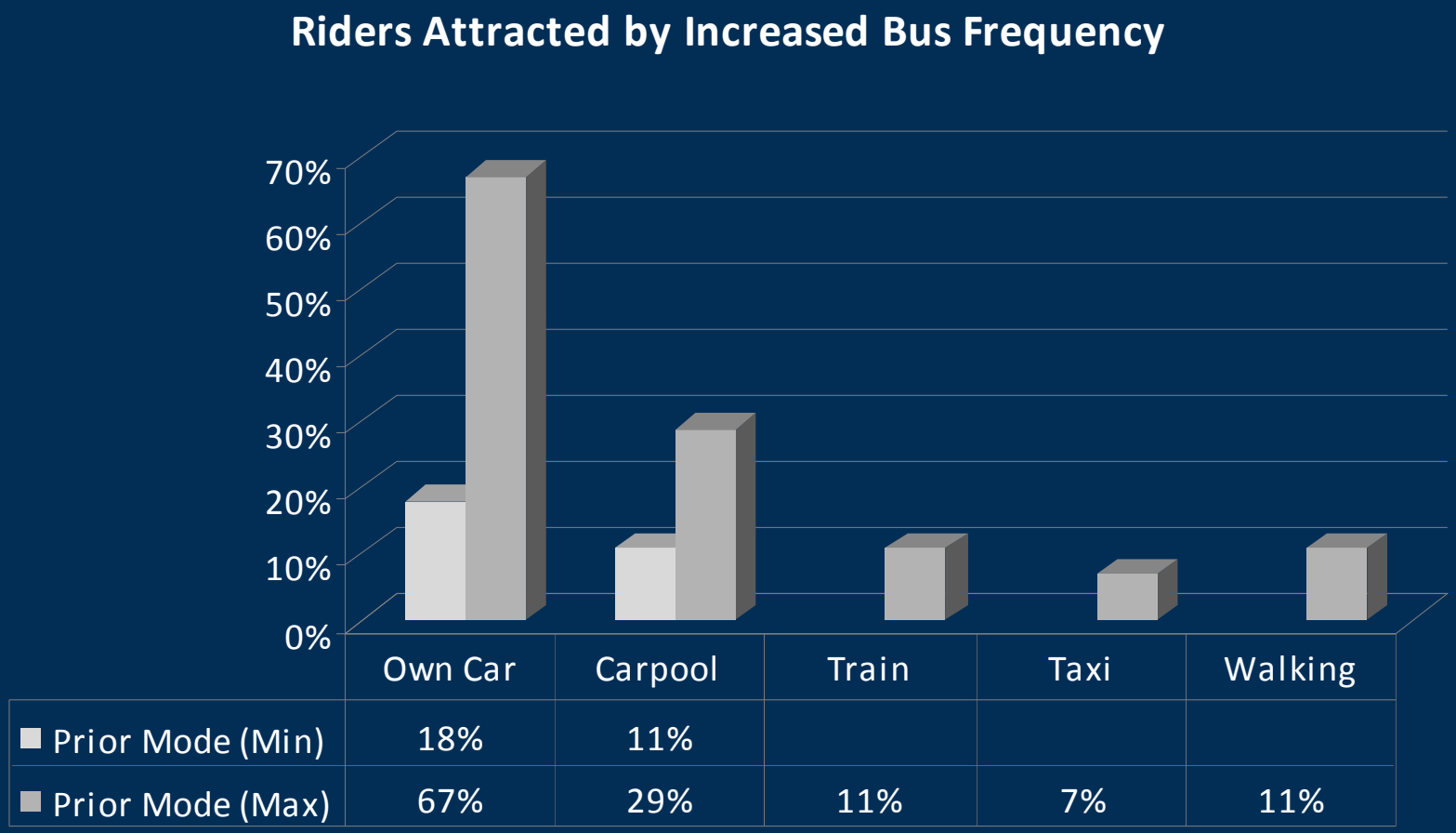
Benefits / Effectiveness



Source: U.S. DOT. 2009. *Public Transportation's Role in Responding to Climate Change*. Washington: Federal Transit Administration, U.S. Department of Transportation. Note: the "private auto" figure is for a single-occupancy vehicle.

CAMBRIDGE SYSTEMATICS

Translating Ridership Increase into Vehicle Miles Travelled



Source: TCRP 95 Traveler Response to Transportation System Changes

CAMBRIDGE SYSTEMATICS

Case Studies – Santa Monica

- Doubled frequency on route to LAX (20 to 10 minutes)
- New advertising and small route adjustments
- Resulted in 23 percent ridership increase

CAMBRIDGE SYSTEMATICS

Energy Aware Planning Guide
Transportation and Land Use Strategies

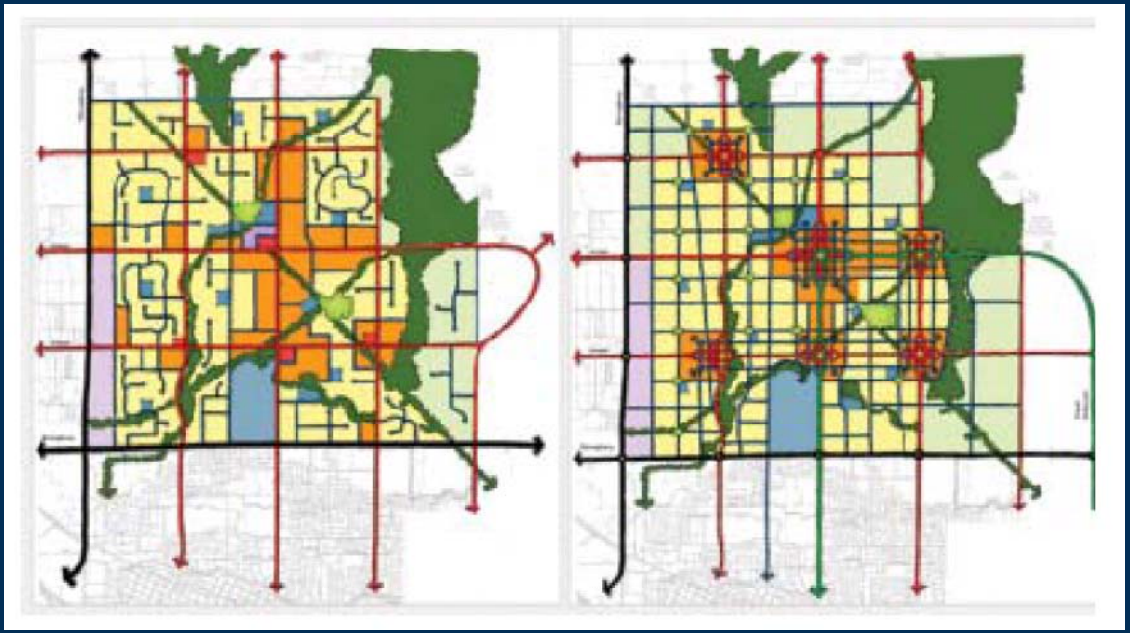
Land Use Strategies

- Smart Growth Development
- Land Use Diversity
- Transit-Oriented Development
- Pedestrian Facilities / Site Design
- Freight Movement Planning
- Parking Pricing
- Parking Supply Management
- Complete Streets and Street Design
- Street Trees
- Bikeways
- Bicycle Parking and Facilities

CAMBRIDGE SYSTEMATICS

Smart Growth Development

- Density
- Diversity
- Design
- Destinations
- Distance to transit



Conventional Suburban

Traditional Neighborhood

CAMBRIDGE SYSTEMATICS

Land Use Example – Smart Growth Development

- Downtown Infill & Redevelopment
- Industrial Redevelopment
- Commercial Redevelopment
- Transit-Oriented & Transit-Ready Development
- Smart Greenfield Development

ENERGY AWARE PLANNINGGUIDE L.1.1

SMART GROWTH DEVELOPMENT

Smart growth is a term use for compact, mixed-use developments where it is easy to get around on foot, bicycle, or by transit. Creating these types of environments can be an effective method of reducing greenhouse gas emissions and driving. Environments that mix commercial and residential land uses and put people within walking, bicycling or mass transit distance of their destinations can reduce driving by 20 to 40 percent.[1]

A smart growth environment can be created by applying the "5 D's" – density, diversity, design, destination, and distance to transit (see sidebar). However, a development may be subject to additional considerations and unique challenges depending on its context – whether the development is in an urban area, an industrial area, a commercial area, etc.

To illustrate how smart growth principles (the 5 D's) can be applied across a range of contexts, this section discusses five "smart development opportunities," or typical conditions in which new growth or change can occur across California's many jurisdictions. These include:

L.1.A: Downtown Infill & Redevelopment
L.1.B: Industrial Redevelopment
L.1.C: Commercial Redevelopment
L.1.D: Transit-Oriented & Transit-Ready Development
L.1.E: Smart Greenfield Development

Each smart development opportunity section highlights the unique challenges and opportunities associated with

A conventional suburban site (left) contains widely spaced blocks, disconnected streets, and land uses (shown in color) separated by long distances. By contrast, a smart growth or traditional neighborhood development site (right) contains closely spaced, interconnected blocks and mixed land uses.

different urban contexts and provides case examples.

General Plan Language Ideas and Implementation Ideas

Smart growth development can be supported by application of the 5 D's discussed above. General plan language ideas and implementation strategies for each of the 5 D's are largely covered in other sections of the guidebook, as indicated below. Additionally, each of the development opportunity sites discussed in this section contains ideas for implementing the 5 D's in different development contexts.

Density

» General plan language ideas and implementation

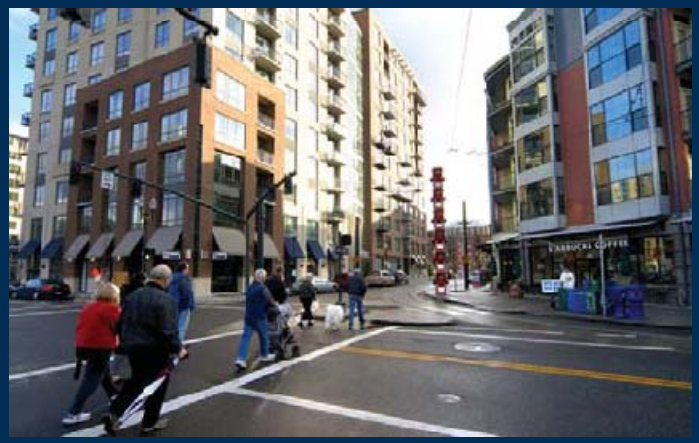
CALIFORNIA ENERGY COMMISSION L.1.1 1

CAMBRIDGE SYSTEMATICS

Industrial Sites

Opportunities

- Tend to be located near core urban areas close to transit and destinations



Portland's Pearl District

Challenges

- Conflicts with industrial uses
- Concerns over reducing industrial land supply
- Brownfield remediation
- Costs for public improvements

CAMBRIDGE SYSTEMATICS

Commercial Redevelopment

Opportunities

- Sites may be on key corridors / near residences
- Large supply of parcels
- Already served by utilities

Challenges

- Zoning
- Community opposition
- Possible displacement of existing businesses

Sonoma Mountain Village Before

Codding Enterprises

Sonoma Mountain Village After

Codding Enterprises

Estimating Energy Reduction

- Energy Aware Planning Guide research
- Available tools

CAMBRIDGE SYSTEMATICS

Energy Aware Planning Guide Strategy Effectiveness Research

Energy Reduction Mechanism

Relevant Facts

Strategy

Strategy

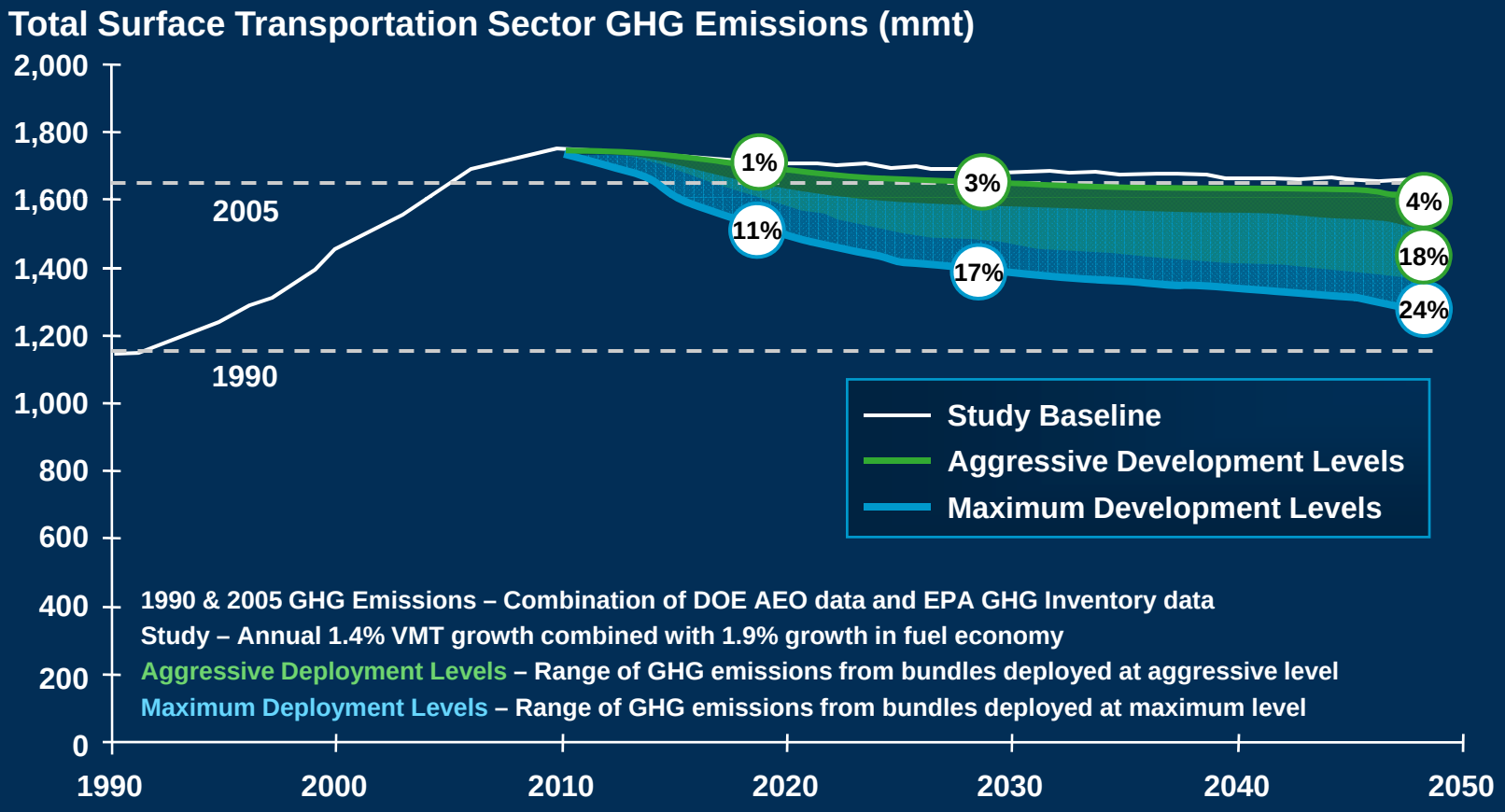
Strategy

Energy Aware Strategies	Energy Reduction Mechanism	Relevant Facts
L.1.1 – L.1.4 Smart Growth Development Opportunities, Land Use Diversity , Transit Oriented Development , and Design		
Apply smart growth principles at develop-ment sites	Reduce auto vehicle miles traveled (VMT)	Applying smart growth principles (density, diversity, design, distance to transit, etc.) at a specific site can reduce vehicle miles traveled by approximately 20-40 percent[3] compared to conventional development. The degree of benefit depends on the details of the design and the development context.
L.1.5 Freight Movement Planning		
Freight VMT reduc-tion strategies	Reduce vehi e miles traveled (VMT) from ight vehicles	
L.2.1-L.2.2 Parking Pricing and Parking Supply Mana ment		
Implement progres-sive parking pricing and management policies	Reduce vehicle miles traveled Improve vehicle fuel economy if congestion is reduced	

"Applying smart growth principles (density, diversity, design, distance to transit, etc.) at a specific site can reduce vehicle miles traveled by approximately 20-40 percent compared to conventional development."

Moving Cooler Spreadsheet Tools

Range of Annual GHG Reductions of Six Strategy Bundles (Aggressive and Maximum Deployment)



Note: This figure displays the GHG emission range across the six bundles for the aggressive and maximum deployment scenarios. The percent reductions are on an annual basis from the Study Baseline. The 1990 and 2005 baseline are included for reference.

CAMBRIDGE SYSTEMATICS

ICLEI CACP and CAPPA Spreadsheet Tools

Welcome to the Climate and Air Pollution Planning Assistant (CAPPA)

This tool is designed to assist local governments in identifying emissions reduction projects and policies to implement to meet their own climate and air pollution reduction goals.

To begin using CAPPA, click on one of the links below:

Explore a Specific Emissions Reduction Strategy

Create a Comprehensive Emissions Reduction Plan

User Guide

Developed by

ICLEI Local Governments for Sustainability

Sponsored by

United States Environmental Protection Agency

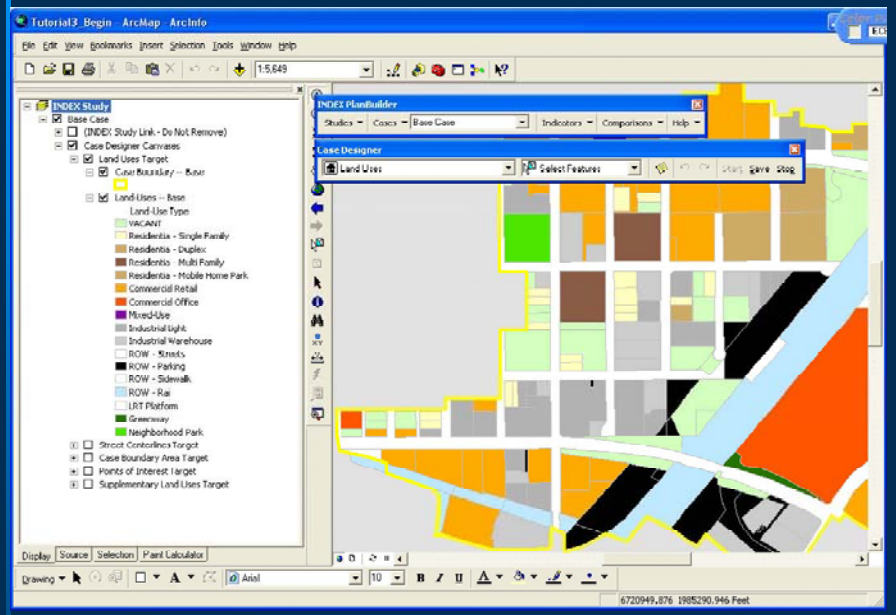
This tool was developed with the assistance of hundreds of local governments throughout the United States. ICLEI would like to thank five Core Research Partners - jurisdictions that provided a wealth of information on 10 or more greenhouse gas emission reduction measures - whose efforts greatly contributed to the completion of CAPPA.

Core Research Partners Include:

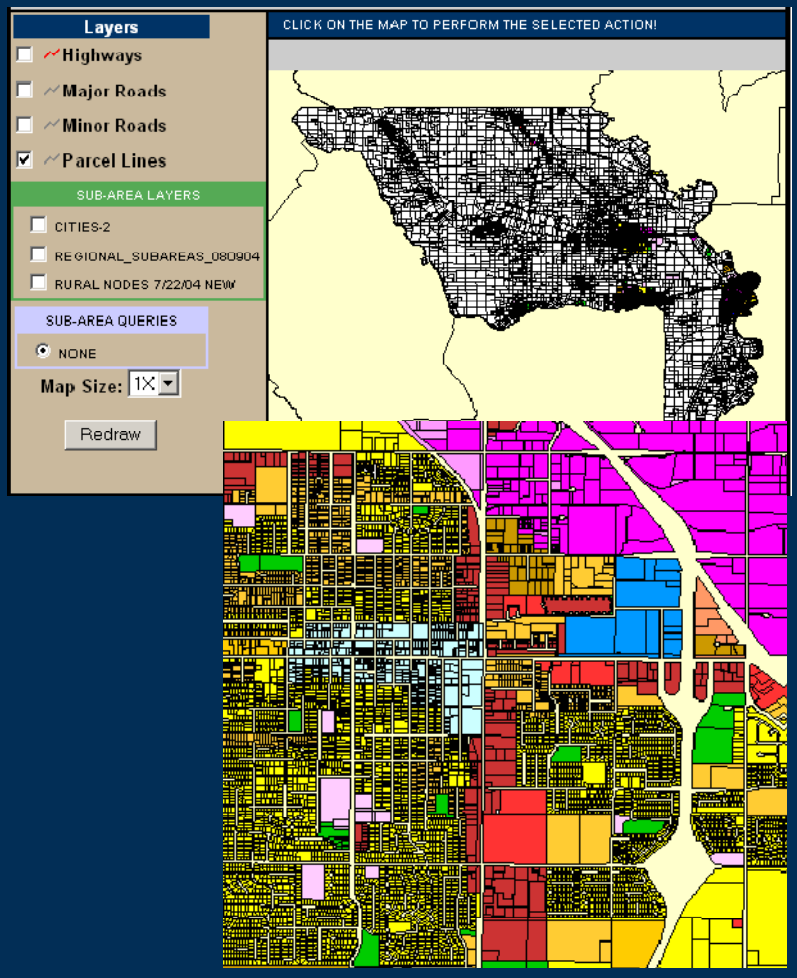
Charlottesville, Virginia
Hillsborough County, Florida
Las Vegas, Nevada
Nashua, New Hampshire
Whatcom County, Washington

CAMBRIDGE SYSTEMATICS

GIS Based Land Use Scenario Planning Tools



INDEX



PLACE3S

CAMBRIDGE SYSTEMATICS

- **Questions about Moving Cooler sketch planning tools, CEC Energy Aware Planning Guide**

Ryan Greene-Roesel

Cambridge Systematics

rgreeneroesel@camsys.com

CAMBRIDGE SYSTEMATICS