

Foundations of Sustainable Transportation Solutions



David J. Carlson, Director of Sustainable Development

It's not easy being green

- Transportation professionals are trying
- New approaches and practices
- Thinking beyond the pavement



What is Sustainable Transportation??



As always;
It DEPENDS.

What is Sustainable Transportation?

- Providing exceptional mobility and access in a manner that meets current development needs without compromising the quality of life of future generations.
- A sustainable transportation system is:
 - Safe
 - Healthy
 - Affordable
 - Renewable
 - Operates fairly
 - Limits emissions and use of new/nonrenewable resources

Essence: Functional requirements + System efficiency +
Environmental Stewardship = Sustainable Transport

Transportation Elements and TBL

Triple Bottom Line



Sustainability Umbrella: Complementary Efforts

Planning and Environment Linkages

*System efficiency
strategies*

GHG emissions reductions

*Environmental
Streamlining*

*Context Sensitive
Solutions*

Asset Management

Smart Growth

Eco-Logical

Livability

*Environmental Management
Systems*

TDM/Pricing

Green Infrastructure

Environmental Stewardship

Materials Recycling



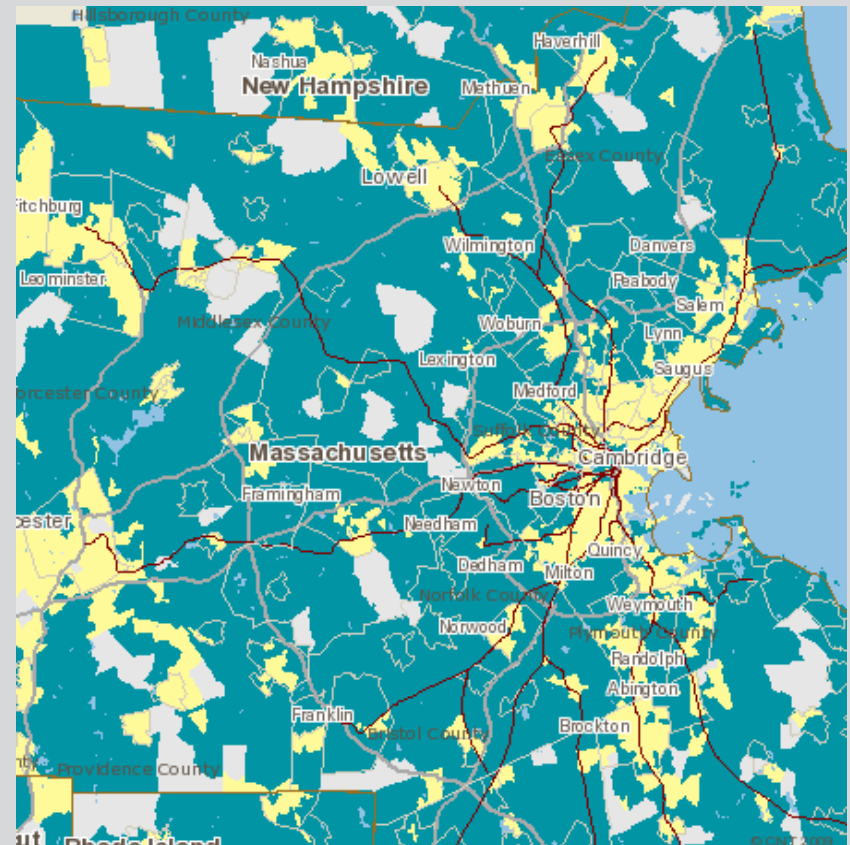
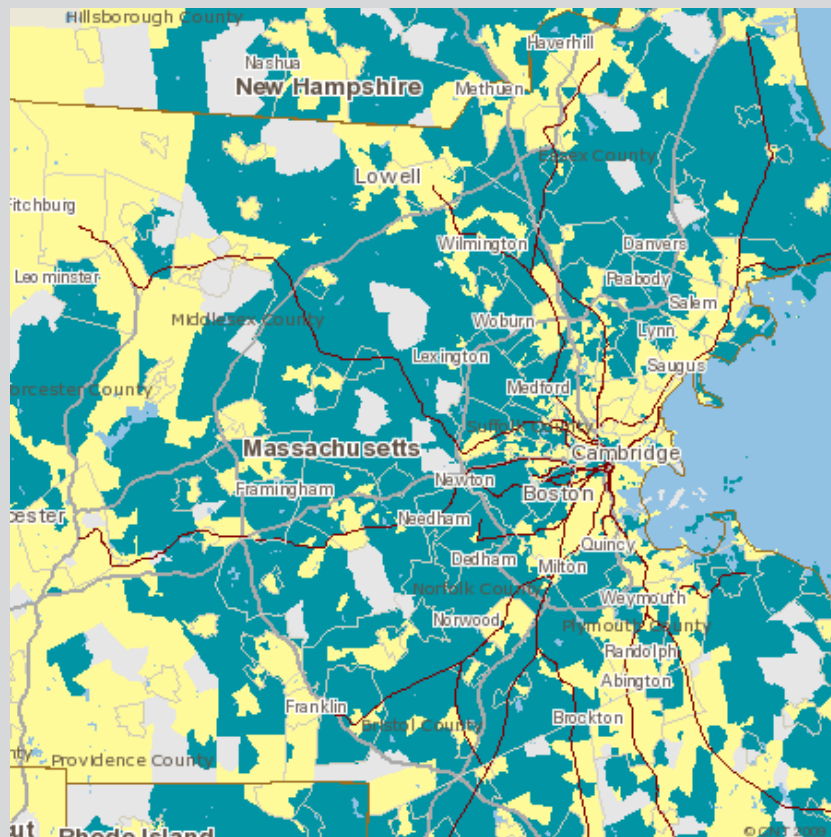
Livability

- Encourage mixed-use, condensed developments can increase walking and biking to destinations of short distances.
- Implementing strategies that incorporate the principles of livability will result in improved quality of life for all Americans
 - create more efficient and more accessible transportation networks that services the needs of the individual communities.
- Fostering the concept of livability in transportation projects and programs will help America's neighborhoods become safer, healthier and active.

Cost of housing, compared to its location efficiency, by measuring the transportation costs associated with place.

Housing Costs factored as a percent of the Area Median Income

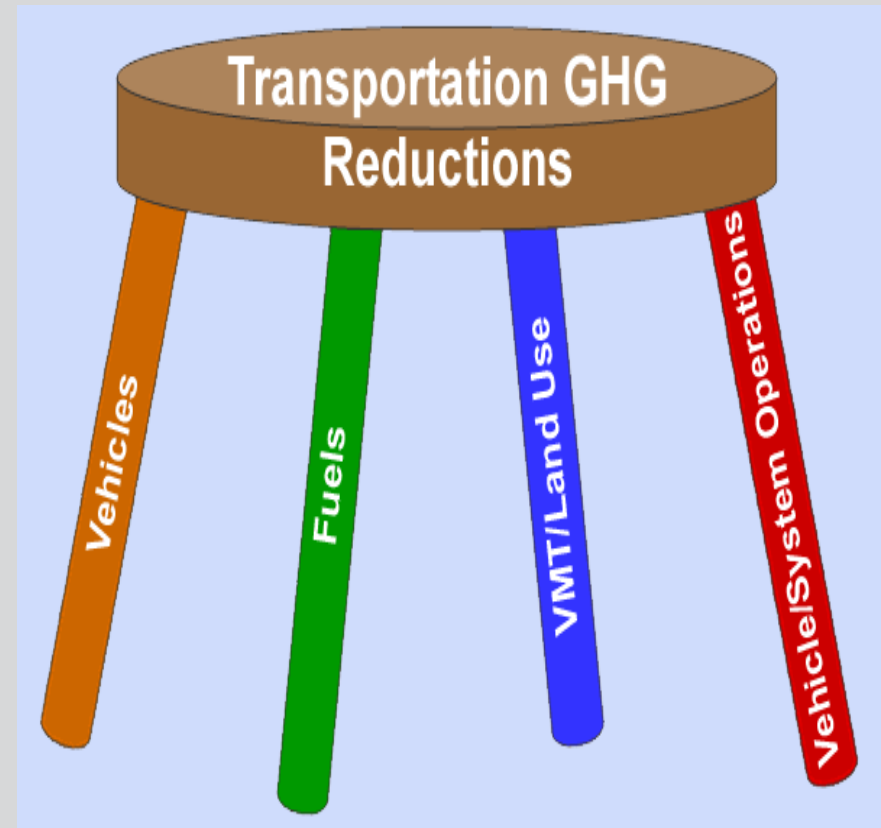
Cost Burden placed on the average household by H+T expenses



Blue = 30% or more of Income

Greenhouse Gases Reduction Strategy

- Raise vehicle energy efficiency
- Reduce carbon content of fuels
- **Reduce VMT**
 - Land use
- **Improve vehicle and system operations**



Transportation Strategies for Sustainability

1. Vehicle / Fuel Technological Changes (Life cycle)

2. Road / Vehicle Operations Improvements:

- **Conventional Traffic Flow Improvements**
 - Traffic Signal Timing
 - Ramp Metering
 - Bottleneck Removal
- **Intelligent Transportation System Improvements**
 - Smart Highways
 - Smart Vehicles
- **Driver Education**

Transportation Strategies for Sustainability

3. Demand Management

- **Modal Substitution**
 - Rail Substitutes for Truck
- **Telecommunications Substitutions**
 - Telecommuting
- **Pricing Incentives / Disincentives**

4. Support Land Use Strategies

- Compact Development
- Mixed Use Development
- Higher Development Densities

The overlap: Co-benefits

- TDM

- VMT

- ITS

- PEL

- CSS

- LID

- C&GS

- BPD

- LCCA

- What's in your tool box that can achieve the objectives?

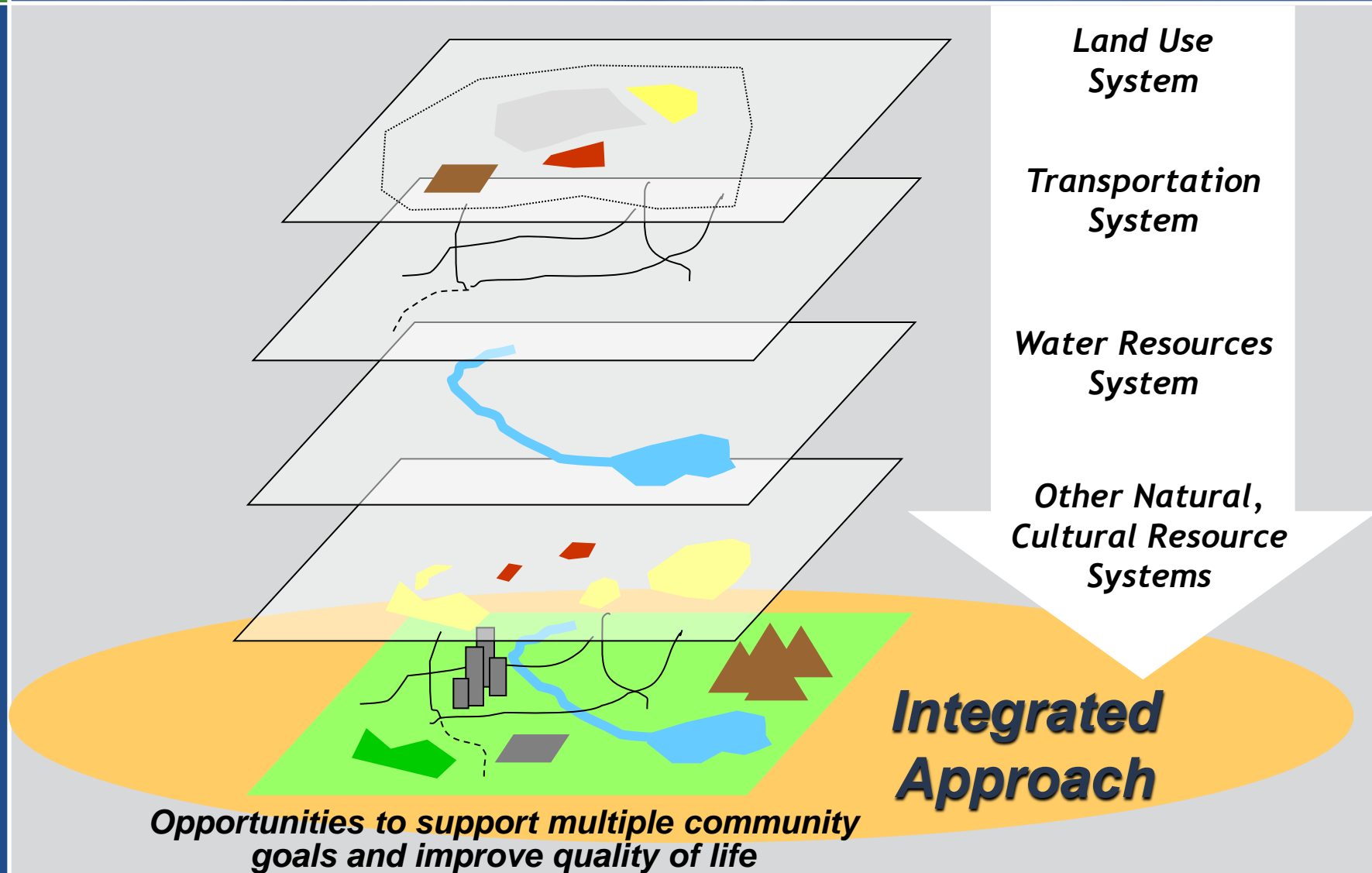
- What needs sharpening to prepare for the new landscape?

- New metrics and expectations

Roll Climate Change and Livability together and what do you get?

Sustainability!

Integrated Planning



Why Integrated Planning?



Why Integrated Planning?



Integrated Planning: A New Way of Doing Business

From...

To...

A focus on delivering transportation outputs

A focus on achieving multiple outcomes that are consistent with community and resource agency goals

An understanding of the effects of specific transportation modes

An understanding of the transportation system and how that system fits within broader human and natural systems

Separate planning based on who owns and operates infrastructure and services

Collaborative planning based on achieving sound system-wide outcomes

Planning transportation and land use separately

Planning transportation and land use concurrently and iteratively to achieve desired outcomes

Transportation planning often does not recognize environmental factors

Environmental affects and advanced mitigation are considered during transportation planning

Multiple, Lasting Benefits from Land Use

Changes in land use can have longer term, cumulative benefit over time

- Land use change tends to be more “permanent,” supporting continuing choice of non-SOV modes (as compared to individual choice to drive less or slower)
- As more communities and neighborhoods in a region become more walkable and linked by transit, multimodal choice becomes real – and used more often by more people
- More people and businesses then make location choices based on available travel options
- The transportation system should support LU changes

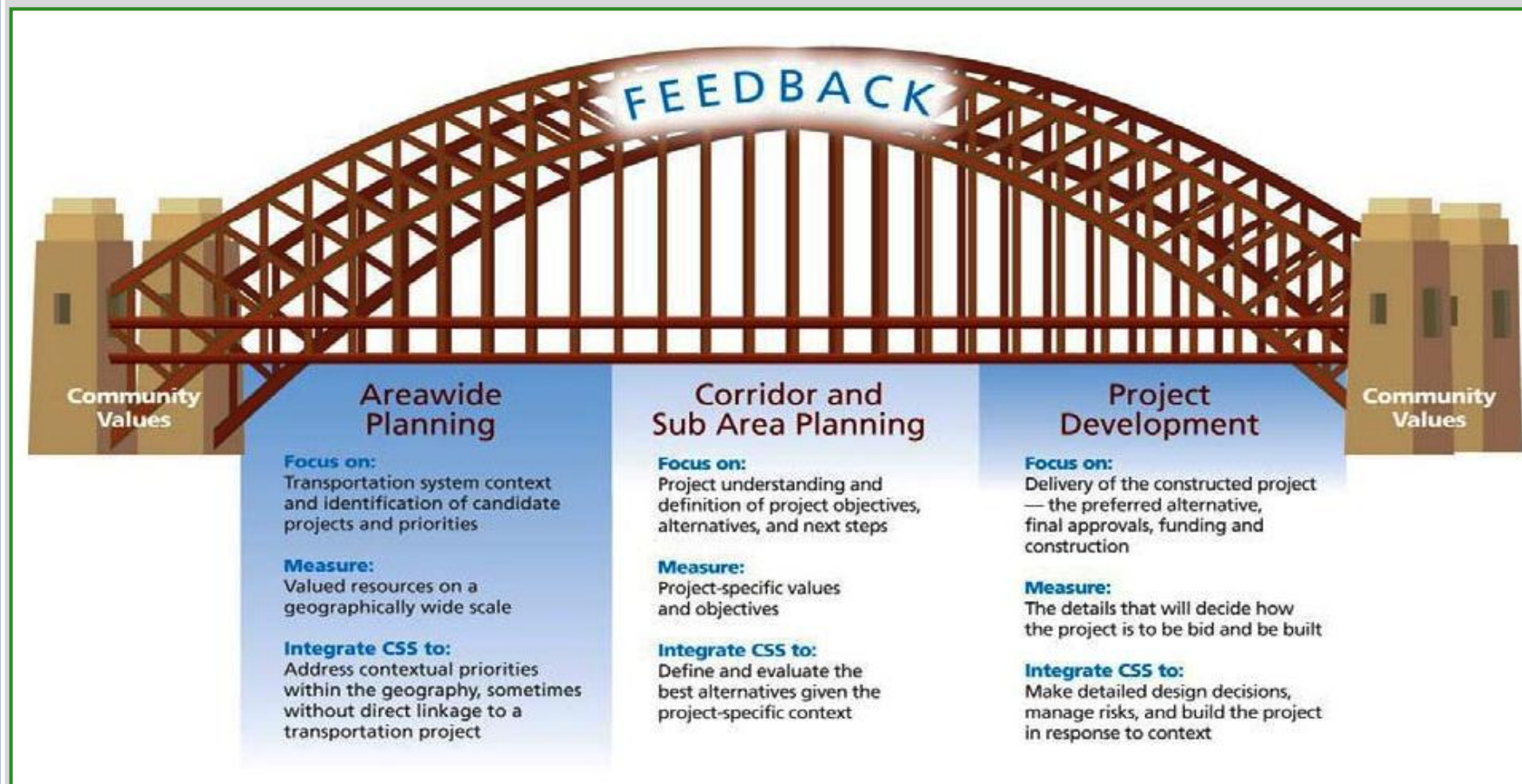
Context Sensitive Solutions (CSS)

- A collaborative, interdisciplinary approach to develop a transportation facility that
 - Fits its physical setting
 - Involves all stakeholders
 - Preserves Resources:
 - Scenic
 - Aesthetic
 - Historic
 - Environmental
 - Maintains safety and mobility

Principles of CSS

- Strive toward a shared stakeholder vision to provide a basis for decisions
- Demonstrate a comprehensive understanding of context — transportation and other elements
- Foster continuing communication and collaboration to achieve consensus
- Exercise flexibility and creativity to shape effective transportation solutions, while preserving and enhancing community and natural environments

Integrating CSS in Planning and Project Development



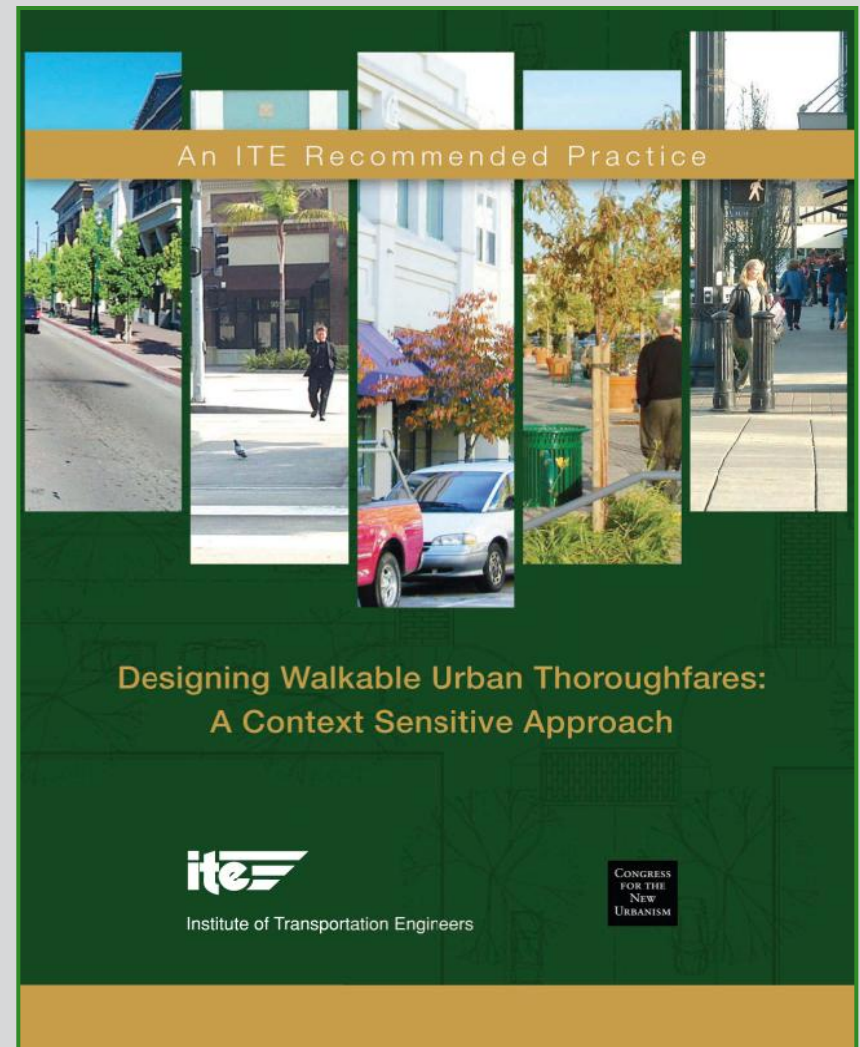
Planning Linkages and CSS

- Scenario/Visioning techniques
- Linking Planning processes and using CSS to deliver solutions:
 - Roads-- Networked, More Numerous in Type, Context-Sensitive.
 - Balance and Choice - Multimodal, Connected Network.
 - Better Single Goal Problem Solving
 - New Multi-Goal Problem Solving



CSS approaches and applications

- Traffic modeling
- Access and mobility
- Speed
- Road capacity
- Design flexibility and exceptions
- Safety



Context Sensitive Solutions



- Travel behavior analysis
- Access Management Strategies
 - Roundabouts
 - Road diets
 - Bike & Pedestrian accommodation
 - Parking elements
- Street Design Manuals
 - NYC
 - Charlotte, NC

Context Sensitive Solutions Outcomes

Context Sensitive Solutions lead to outcomes that:

- Are in harmony with the area community and values
- Are safe for all users
- Satisfy requirements and resolve problems identified by a full range of stakeholders
- Meet or exceed the expectations of both designers and stakeholders
- Demonstrate effective and efficient use of resources (people, time, budget, materials) among all parties.
- Add lasting value to the community, environment, and transportation system

CSS+S

- Add lasting value to:
 - The community
 - The environment
 - The transportation system
- Links CSS to the triple bottom line of sustainability
 - Robust economic growth
 - Better than before health of the environment
 - Improved quality of life for all citizens



Sustainable Transportation Issues-Indicators-Goals

| Economic | Social | Environmental |
|----------------------------------|-----------------------------------|----------------------------------|
| Traffic congestion | Equity / Fairness | Air pollution |
| Infrastructure costs | Impacts on mobility disadvantaged | Climate change |
| Mobility barriers | Human health impacts | Noise and water pollution |
| Consumer costs | Community cohesion | Habitat loss |
| Accident damages | Community livability | Hydrologic impacts |
| Depletion nonrenewable Resources | Aesthetics | Depletion nonrenewable Resources |

What would this mean to you? Available “Tools”

- Challenges for measuring performance to different set of metrics
- Planning Factors
 - Accessibility and mobility
 - Environment, energy conservation, quality of life
 - Planned growth and economic development
 - Integration/connectivity between transportation systems
 - Efficient system management
- 23 CFR 450.320 – CMP in TMAs
- 23 CFR 450.210

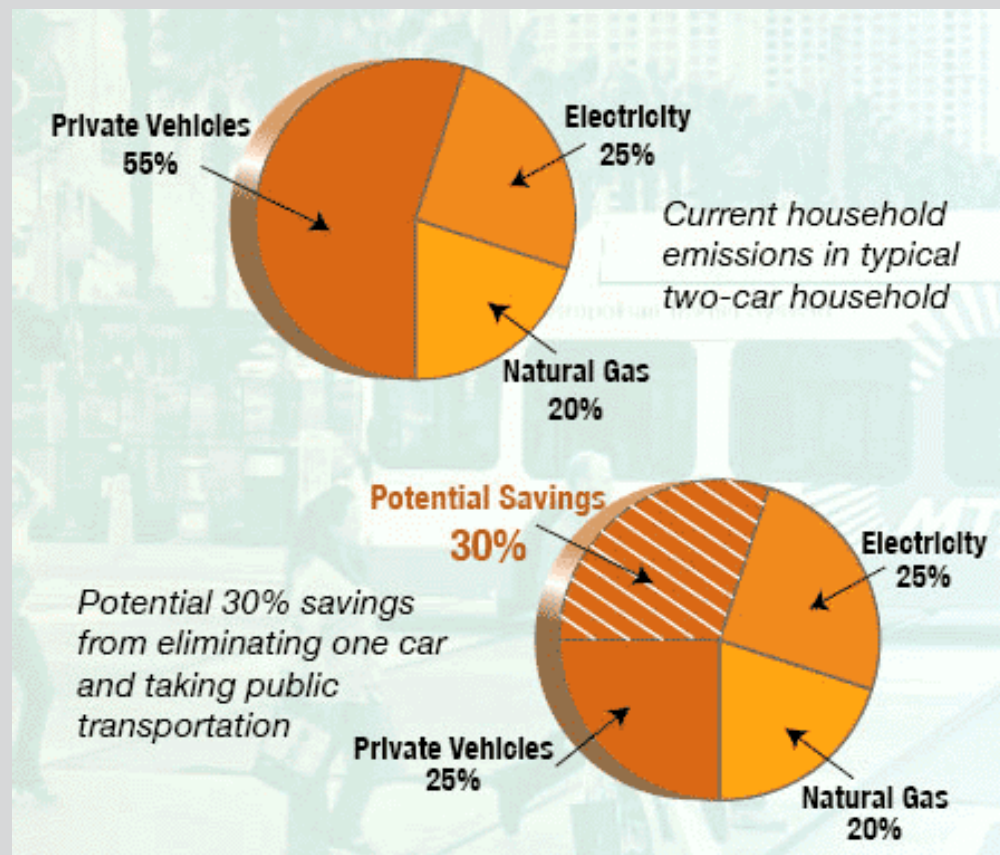
Looking Ahead

- Increase in attention to TDM due to convergence of factors, climate change is just one
- Related social/economic factors motivating TDM interest
 - High gas prices, energy security, job access
 - Increased traffic congestion
 - Potential for faster implementation and results at lower cost than large infrastructure projects
 - Public health concerns / obesity
 - Increased emphasis on efficient system management & operations (pricing, etc.)
 - Livability/Quality of life issues / sustainability



Potential of TDM and Transit

- The use of a private vehicle is the largest contributor to a household's carbon footprint
- A household with one car that uses public transportation saves an average of \$6,251 every year, compared to an equivalent household with two cars without access to transit.



Sources:

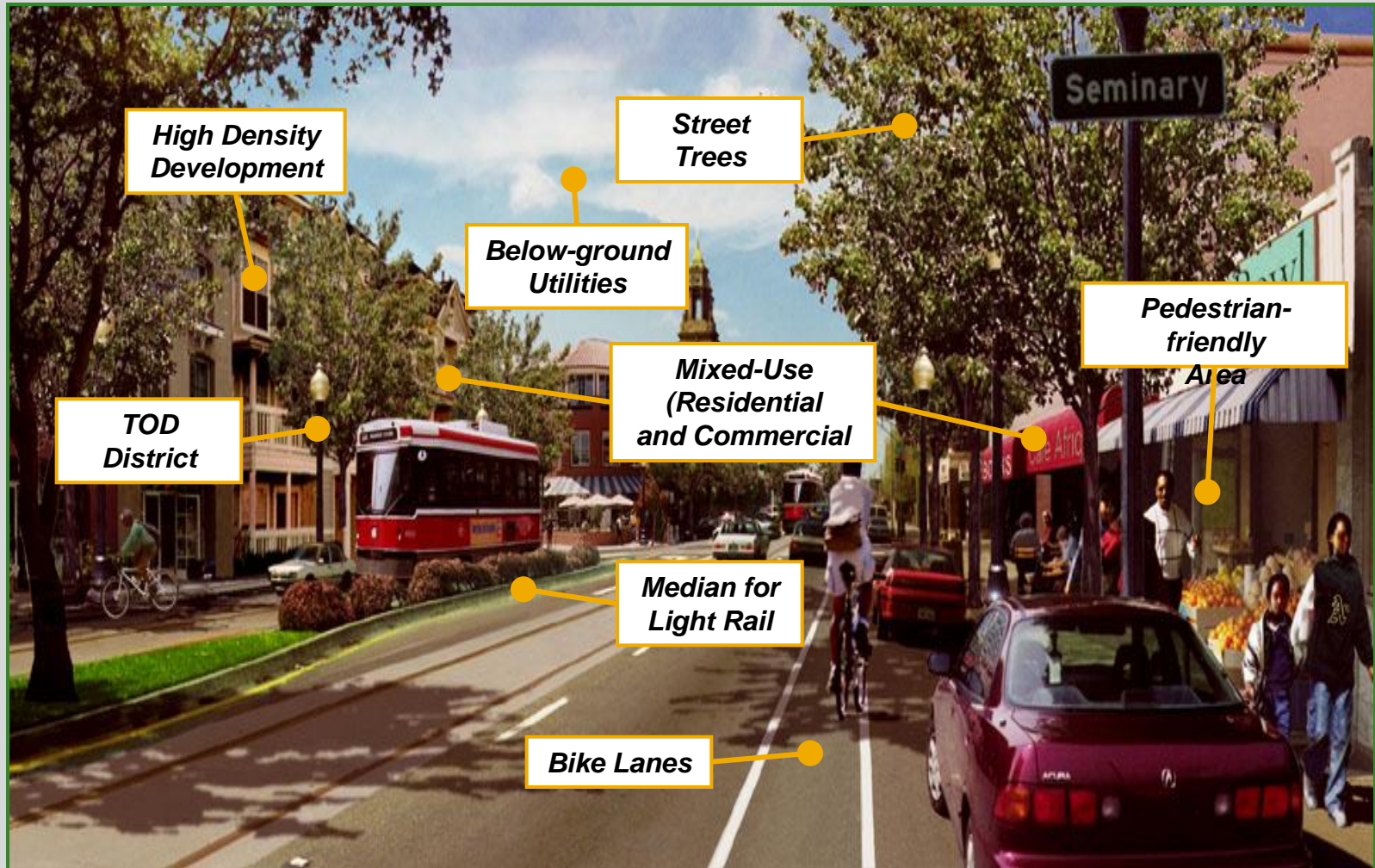
SAIC, *Public Transportation's Contribution to Greenhouse Gas Reduction*. Prepared for American Public Transportation Association (APTA), September 2007.

ICF International, *Public Transportation and Petroleum Savings in the U.S.: Reducing Dependence on Oil*. Prepared for American Public Transportation Association (APTA), January 2007.

Sustainability implementation

- Engage the stakeholders and your multidisciplinary team
 - Sustainability asks for broad participation and contributions
 - New Topics: Use planning process as forum to educate
- Manage multiple goals and objectives
 - Speed and congestion are not the only elements for consideration
 - Invest in visioning up front to save resources in later stages
- Improve and Enhance the natural environment
 - Leaving things better than before
 - Prioritize projects using sustainability performance measures
- Creating community opportunities
 - Thoroughfares for community connectivity rather than barriers
 - Use CSS principles as evaluation criteria to assess progress

Transportation in Service to Sustainable Solutions



Source: www.urban-advantage.com

Sustainability is Sexy

