Building America’s 21st Century Transit Systems

Opportunities for driving transportation projects forward

5 key indicators of sustainable mobility

smart Land use and livable neighborhood materials and construction/operations optimization energy and resource efficiency quality of ambient environment and health emissions and pollution control

by Tian A. Feng, FCSI, FAIA

PUBLIC TRANSIT INFRASTRUCTURE CAN COMPRISE THE GREENEST OF EARTH-FRIENDLY, ENERGY-EFFICIENT TECHNOLOGIES, BUT IT DOES LITTLE GOOD IF PEOPLE KEEP CHOOSING THEIR CARS INSTEAD OF TAKING THE TRAIN. DESIGNING SUCCESSFUL TRANSPORTATION PROJECTS INVOLVES A NEW WAY OF THINKING.

for example, voters passed a $10 billion state bond toward building the nation’s first high-speed rail connecting San Francisco to San Diego. Many other transit projects will be launched or continued over this and the next decade. The needs for implementing...
Sustainable Mobility
Material for infrastructure
Demand for Space
Impact to public health
Energy consumption
CO₂ emissions from consumption and flaring of fossil fuels

North America

Western Europe

Eastern Europe and Former Soviet Union

Middle East

Latin America

Source: EIA, 2002.

Try, Try Again
BP is pinning hopes on a riser cap system

LATEST ATTEMPT
Robots need to slice off the damaged pipe so that the lower marine riser package (LMRP) cap can be fitted on top. Once the cap is sealed, an attached strawline riser will siphon the oil to a ship at the surface.

Relief well 1 began May 2

Drill ship

Relief Wells
Two relief wells being built should enable BP to block the flow of oil with heavy mud and a cement plug. However, the wells will not be operational for at least two months.

Completion expected in August

WHAT'S NEXT
BP will install a detachable riser and hose system in late June or early July to improve flexibility in case there is a hurricane. Other containment options have been put aside indefinitely.

Source: BP

Cost of automobile-based mobility

Source: Time and UN
Lake Merritt 55” SLR (2100) 100 year storm plus wind waves
daily ghg emissions

transit role in reducing transportation ghg emissions

2006
MTC T2035

Bay Area Transportation
100,750 MT CO2e

Bay Area Transit
2,650 MT CO2e

2.6%

Less Transit

2035
MTC T2035

Bay Area Transportation
94,357 MT CO2e

Bay Area Transit
3,417 MT CO2e

3.6%

More Transit

2050
Conceptual
~ 80% GHG Reduction

Bay Area Transportation

Bay Area Transit

Source: BART

Much More Transit

sources: bart, 2010; mtc t2035 plan deir, mtc t2035 travel forecasts data summary; fta national transit database 2008, ftapublic transportation’s role in responding to climate change, 2010.
Grouping the Market Segments

We then grouped the market segments into three categories based on how easily they could be attracted to living in a TOD. Each market segment is described on the following pages, with key attitudes and distinguishing characteristics.

**Easiest to Attract.** Three segments — Transit-Preferring, Urban DINKs and Young Brainiacs — totaling 38 percent of respondents, were judged to be the most easily attracted to TODs based on their strong interest in transit and their low interest in driving relative to the rest of the groups.

**Possible to Attract.** Two segments — Ambitious Urbanites and Mellow Couples — representing 29 percent of respondents, are possible to attract based on having certain interests that match TOD characteristics but are challenging due to other interests.

Source: MTC
ARTA Adopts New Sustainability Guidelines for Public Transit

‘Make American Public Transport Systems Work for Americans’

In the spirit of Earth Day, ARTA released its most recently adopted standard: the Transit Sustainability Guidelines, derived from best practices at home and around the world.

Original funding for the initiative came from an Environmental Protection Agency (EPA) Innovations Grant to the San Francisco Bay Area Rapid Transit District (BART) in 2006.

“We have to make American public transport systems work for Americans, not just lecture people about the environmental benefits of transit,” said Tian Feng, BART’s chief architect, who was the founder of this initiative and editor of the document.

Noting that America’s transit industry is at a critical juncture, Feng continued, “innovations in customer service and integration with community development are vital. The automobile industry succeeded in making cars a prime form of mobility in America, and government became the builder and operator of the automobile-based transportation infrastructure.”

Feng concluded: “We believe the application and implementation of the guidelines will lead to a renaissance of American public transportation where more and more transit systems offer enjoyable, timely, and safer transportation solutions.”

According to Timonie Hood, the EPA innovation project manager: “The guidelines represent a holistic approach to transit sustainability covering design through operations and maintenance. The combined environmental benefit of making American transit systems greener and more rider-friendly will make our communities more sustainable and dramatically reduce pollution, greenhouse gas emissions, and energy consumption.”

Primary objectives of the sustainability guidelines include:

- Improving mobility and creating livable communities through facilitating more environmentally friendly forms of mobility, such as walking, biking, and public transit, and
- Reducing transportation-related and other basic causes, and
- Reducing pollution and greenhouse gases, and
- Reducing energy use and costs, and

Sustainable Transit Guidelines
# TABLE 1
Opportunity for Implementing Sustainability Measures

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<th>System Route, Transit Mode and Node (Section 2)</th>
<th>Infrastructure and Facilities (Section 3)</th>
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<td>Emissions and pollution control</td>
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Implementation opportunity: * Less, ** More, *** Most.
Introduction

**Smart Land Use & Livable Neighborhoods**
- Partner with local and regional planning agencies
- Promote partnerships for TOD
- Make Livable Neighborhoods a centerpiece for planning
- Scale transit appropriately
- Plan for Intermodal Connections
- Reduce long-term auto dependence
- Engage stakeholders early

**Energy and Resources Efficiency**
- Consider energy in mode choice
- Design alignment to optimize energy use
- Partnerships for renewable energy

**Quality of Ambient Environment**
- Promote healthy modes of transportation

**Emissions & Pollution Control**
- Evaluate long-term impact of modal choices
- Design to minimize noise & vibration
make livable neighborhoods a centerpiece of system planning - make transit stations and associated infrastructure public destination points in their own right, by understanding user needs to ensure that transit architecture can act as a catalyst for the surrounding environment.
section 3 infrastructure & facilities – case study
partnerships for renewable energy

- TriMet partnering with Portland General Electric (PGE) to design and construct innovative renewable energy initiatives.
- Leverage Utility’s expertise in energy production & transit agency’s long term facility ownership.
- The Portland Mall Revitalization project will include both photovoltaic (PV) and vertical axis wind turbines (VAWT).
- Enough power to run site lighting, lights for illumination of the exterior screen wrap and buildings’ electrical systems.
- TriMet and Portland State University will monitor the energy output and report on performance.
Section 4 Rolling Stock & Fleet

3D Quality of Ambient Environment and Health

- Southern Nevada RTC in Las Vegas operates the only “specialized” Bus Rapid Transit (BRT) vehicle in the United States
- Key objectives
  - Visually attractive and aesthetically appealing, more “rail-like”
  - Branding an identity separate from other transit services
  - BRT can establish itself as a new and distinct transit mode
- Environmental benefits include:
  - Reduced auto use
Section 5 operations & maintenance – case study
san francisco bay area regional transit connectivity improvement
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