

H-GAC Regional Transit Framework Study  
**EXECUTIVE SUMMARY**



HDR

*DISCLAIMER*

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## BACKGROUND AND PROCESS

Over the next 30 years, the population in the eight county Houston-Galveston region is expected to grow by more than 3 million people. This is nearly the same as adding the entire population of the city of Los Angeles to the population already in the Houston-Galveston region. This growth will undoubtedly change the way people travel within and through the region. Through the Regional Transit Framework Study (RTFS) planning process, four regional transit scenarios have been developed to provide the Houston-Galveston area with alternative visions for addressing the region's transit needs by 2040.

The RTFS scenarios were developed through a three phase planning process that relied on multiple outreach methods to obtain community input. The first phase of the study included a review of current and future regional travel patterns, travel markets, and projected population and employment growth. In addition, transit services in six areas similar to the Houston-Galveston area were analyzed to gain insight on successes and lessons learned by other regional approaches to public transportation. Studying these elements helped identify potential regional transit deficiencies and needs including the following:

- **Service in Developed Areas** - The level of existing or planned transit services in some areas of the region that are already developed have no or insufficient transit service to meet projected transit demand.
- **Future Population Growth** - Population growth will occur in new and emerging areas of the region that are not currently served by public transit, or have no current plans for future transit services.
- **Traffic Congestion** - By 2040, nearly all of the region's major freeways are projected to have more demand than what the freeways are designed for.
- **Community Needs** - In a survey of over 450 non-transit riders in the Houston-Galveston region, 7 out of 10 people said that transit improvements are needed, including:
  - Provide more direct transit routes
  - Provide more frequent and faster services
  - Implement safety related improvements
- **Seamless Transportation** - A network of coordinated local and regional transit services is needed to provide seamless regional travel.

Utilizing the information researched during the first phase of the planning process, the second and third phases of the RTFS focused on the development of the four alternative regional transit scenarios. The four transit scenarios were developed for the framework with consideration to required level of investment and alternative objectives.

- **Scenario 1:**  
*Incremental Expansion* - Assumes current annual transit investments in the region are continued through year 2040 with implementation of future regional transit investments based on the region's highest needs and priorities.
- **Scenario 2:**  
*Maximize Transit Access* - Increase existing transit funding by approximately 25%. Expand direct access to public transit services to more areas of the region and focus on the use of premium bus services such as commuter express and Bus Rapid Transit (BRT).
- **Scenario 3:**  
*Maximize Transit Share* - Increase existing transit funding by approximately 25%. Expand transit availability throughout the region, but prioritize future major transit investments such as high capacity transit services in high demand corridors and activity centers to maximize use of transit.
- **Scenario 4:**  
*Transit Priority* - As a financially unconstrained alternative, this scenario seeks to meet the regional transit deficiencies and needs identified in this study.

## PUBLIC INVOLVEMENT AND COMMUNITY OUTREACH

The main objective of the public outreach program was to capture public input from transit and non-transit riders within the H-GAC region. Outreach included focus groups, telephone surveys, newsletters, public meetings, and presentations to community groups and organizations. Through these community outreach efforts more than 700 people provided their input. Community input provided valuable information about public perceptions of existing transit services and contributed to the development of the four regional transit scenarios.

## PEER REGIONS REVIEW

A comparison of transit in the H-GAC region to other regions provided 'real world' case studies to help shape the transit concepts considered in the alternative transit scenarios. The peer regions review included performance and investment data from six regions which were selected based on several criteria including but not limited to transit modes operated, size of transit system, population, and population density. The peer regions are Atlanta, Dallas-Ft Worth, Denver, Miami-Ft Lauderdale, San Diego, and Seattle.

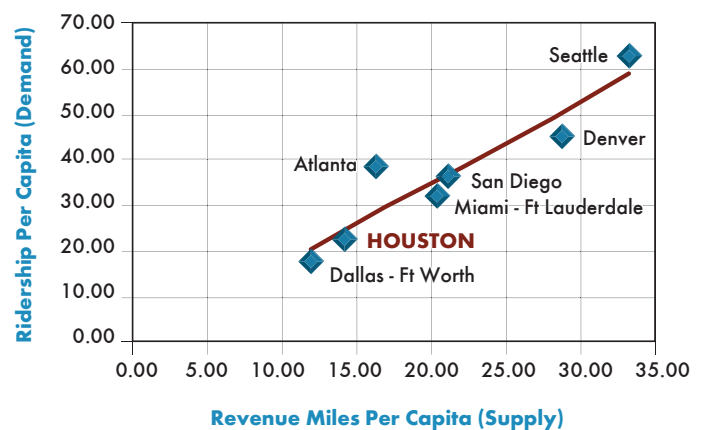
### Peer Region Population and Annual Operating Investment

Region	2007 UZA Population	2000 UZA Land Area (sq mi)	Population per Square Mile	Annual Operating Cost per Capita
Atlanta, GA	4,030,000	1,963	2,053	\$103.89
Dallas-Fort Worth, TX	4,848,000	1,529	3,171	\$84.45
Denver, CO	2,065,000	499	4,138	\$167.19
Miami-Fort Lauderdale, FL	5,244,000	1,116	4,699	\$133.67
San Diego, CA	2,742,000	782	3,506	\$98.55
Seattle, WA	2,864,000	954	3,002	\$328.12
Houston-Galveston, TX	3,632,167	1,141	3,428	\$73.80
Average (not including Houston- Galveston)	2,864,000	954	3,002	\$152.65

Source: U.S. Census Bureau, 2010.

The review of transit performance and investment data produced several significant findings. First, a comparison of the amount of transit service supplied (revenue miles per capita) and transit service consumed (ridership per capita) revealed an interesting pattern as illustrated in the comparison of peer region transit supply and demand chart on the right. Among its peers, the Houston-Galveston region has the second lowest ridership per capita and provides the second lowest number of revenue miles per capita. Second, although annual transit operations investment levels between the peer regions vary greatly, the H-GAC region invests the lowest value per person. On average, the six peer regions invest approximately \$153 per person per year in transit operations. In comparison, the Houston-Galveston region invests the lowest value per person at approximately \$74 per person per year.

### Comparison of Peer Region Transit Supply and Demand



Source: U.S. Census Bureau, 2010.

## REGIONAL TRANSIT DEFICIENCIES AND NEEDS

To develop a comprehensive year 2040 transit vision, it is important to have a clear definition of existing transit related deficiencies and anticipated future needs. Local jurisdictions and transit operators provided input to help identify needs within their local areas, while an analysis of demographic information, projected traffic conditions, travel demand, and

existing and planned transit service and capital investments, revealed patterns regarding at the local and regional level. Some of the transit deficiencies and needs identified by this approach are applicable to the entire region, while others are more specific to smaller geographic areas. The following general transit deficiencies have been identified in the Houston-Galveston region:

- Projected traffic congestion will impact the performance of existing and planned transit services.
- Some existing highly developed areas of the region have limited or no transit service.
- Population growth will occur in new and emerging areas of the region that are not currently served by public transit, or have no current plans for future transit services.
- Expanded transit services potentially lack required support infrastructure such as operations and maintenance facilities and park-and-ride facilities (including capacity at existing facilities).

The following transit needs have been identified in the Houston-Galveston region:

- New commuter based services to meet the demand of the projected population growth in suburban communities.
- New bus and demand response services to connect local communities with regional commuter services.
- Investments in right-of-way improvements or other transit priority measures to reduce the impact of traffic congestion.
- Network of coordinated local and regional transit services to provide seamless regional travel.

## YEAR 2040 TRANSIT SCENARIOS

Four transit scenarios were developed for the year 2040 to provide options for improving transit service in the H-GAC region. Each of the scenarios builds on transit enhancements already identified in the Regional Transportation Plan (RTP). New enhancements that are beyond what is currently identified in the RTP include improvements to existing transit service, expansion of transit service to un-served or underserved areas, and the inclusion of new transit services.

### Transit Scenario Comparison

Scenario	Investment Level	Philosophy	Characteristics
<b>1</b> Incremental Expansion	<b>Lowest</b> (Continuation of existing annual transit funding levels)	<ul style="list-style-type: none"> <li>• Balance of future regional transit investment based on region's highest priorities</li> <li>• Incremental expansion of existing transit service</li> </ul>	<ul style="list-style-type: none"> <li>• Cost constrained based on existing and projected future revenues through 2040</li> <li>• Modest number of enhancements were identified for fixed route and premium bus service</li> <li>• Express bus system modified to accommodate HCT Peak service</li> <li>• Includes METRO Phase II High Capacity Transit corridors (transit modes may differ than originally conceived)</li> </ul>
<b>2</b> Maximize Transit Access	<b>Moderate</b> (Increase existing transit funding by approximately 25%)	<ul style="list-style-type: none"> <li>• Distribute regional transit investments in existing and future population and employment centers to maximize overall transit access</li> </ul>	<ul style="list-style-type: none"> <li>• Cost constrained based on a targeted funding level increase from 2015 through 2040</li> <li>• Focuses on expansion of services through premium bus modes: freeway commuter express and arterial bus rapid transit</li> <li>• Lowest capital investment of any scenario for high capacity transit modes (i.e. light rail, commuter rail, etc.)</li> <li>• Lower overall capital investment allows for greater expansion of the regional transit service area</li> </ul>
<b>3</b> Maximize Transit Mode Share	<b>Moderate</b> (Increase existing transit funding by approximately 25%)	<ul style="list-style-type: none"> <li>• Expand transit service throughout the region, but focus transit investments in high priority corridors to maximize mode share</li> </ul>	<ul style="list-style-type: none"> <li>• Same cost constraint as Scenario 2</li> <li>• Future transit investments focused in high demand corridors to maximize transit mode share</li> <li>• High capacity transit (HCT) services expanded to serve more corridors</li> <li>• HCT replaces Scenario 2 premium bus services in the highest demand corridors</li> <li>• Transit service area is more compact and focused in higher density areas; however, services are still provided in suburban and rural areas</li> </ul>
<b>4</b> Transit Priority	<b>Highest</b> (Increase existing transit funding by approximately 60%)	<ul style="list-style-type: none"> <li>• Seeks to meet the regional transit deficiencies and needs identified in this study</li> </ul>	<ul style="list-style-type: none"> <li>• Cost is unconstrained to demonstrate what is necessary to meet most of the region's transit deficiencies and needs through year 2040</li> <li>• Includes the largest network of fixed route bus, premium bus and high capacity transit services</li> <li>• Maximized service levels consistent with defined standards and maximized direct connections to increase effectiveness through the reduction of transfers</li> </ul>

Source: HDR Engineering Inc., 2010.

Seven regional transit service modes were selected for inclusion in the Framework Study based on applicability to the H-GAC region.



- **Demand Response** – Also known as paratransit or dial-a-ride, this service provides on-demand, shared ride, curb-to-curb service to people with disabilities, senior citizens, and the general public.



- **Vanpool** – Shared-ride service that allows groups of people living in a common location the ability to commute together to a common destination.



- **Fixed Route Bus** – Two-way bus service that primarily operates on arterial streets to provide local and regional transit access.



- **Commuter Express Bus** – Enhanced-speed, moderate-volume commuter or regional service that operates primarily on the region's freeways system, including HOV lanes, and managed lanes. This service typically operates between park-and-ride locations and employment centers throughout the region.



- **Arterial BRT** – Two-way bus service that operates at higher speeds than traditional fixed route bus services by taking advantage of limited stops as well as other time-saving measures such as signal priority systems.



- **High Capacity Transit Peak Period** – HCT Peak Period service offers higher speed operations and higher volume passenger capacity than traditional commuter express bus service. Higher speeds are achieved by operating in an exclusive guideway, while the increased passenger capacity is achieved through vehicle design (bus or rail) and/or service frequency.



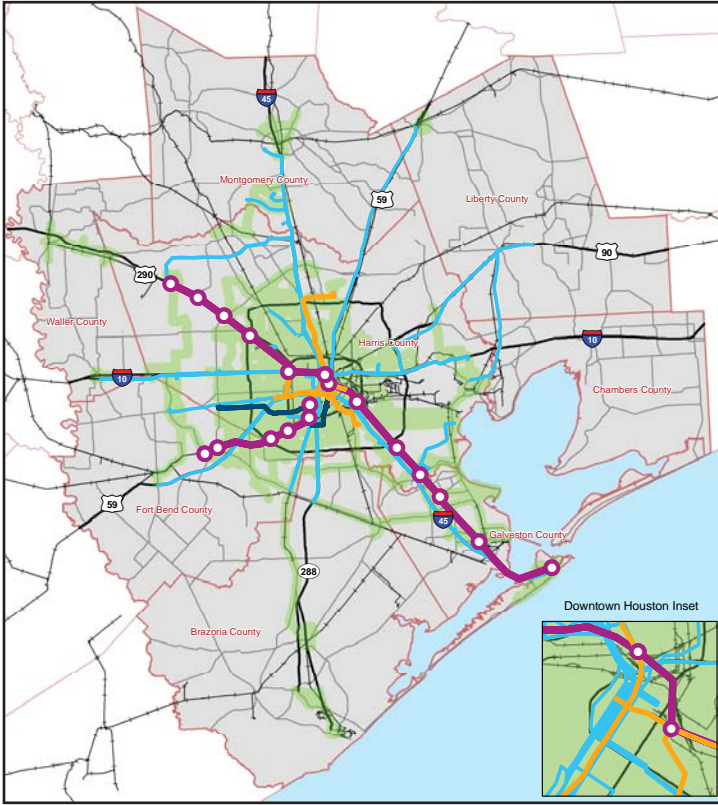
- **High Capacity Transit All-Day** – Frequent, all-day high passenger carrying capacity rail or bus service that typically operates in a dedicated guideway and stops for passengers only at designated stations.

## Transit Investments by Scenario

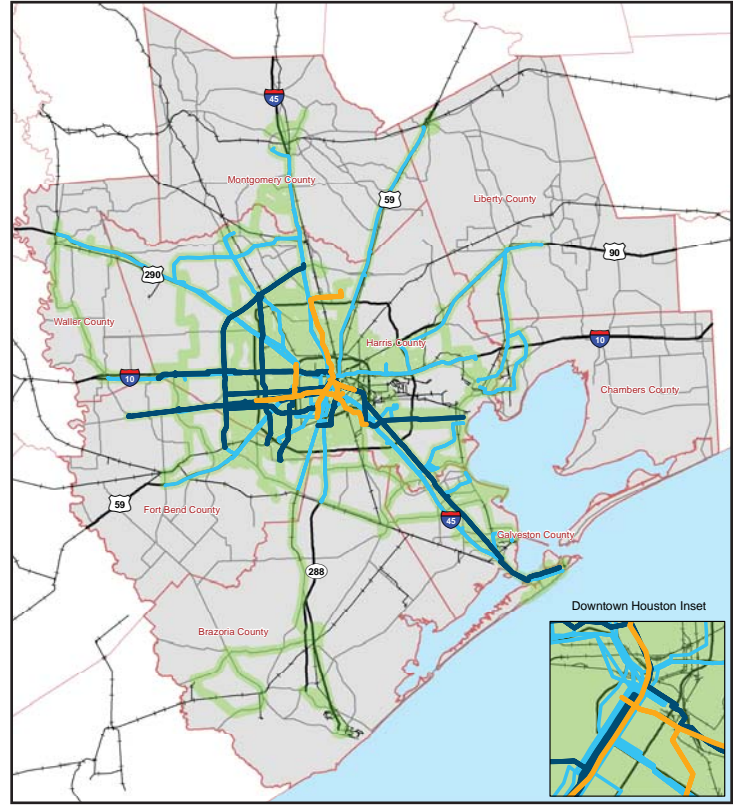
Investment Options	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Local Transit Service Improvements	---	●	●	●
Vanpool – Expansion	---	---	●	●
Basic Expansion of ADA Paratransit Service	---	●	●	●
Demand Response – Expansion	●	●	●	●
Fixed Route Bus – Route Extensions	---	●	●	●
Fixed Route Bus – Increased Frequency	---	●	●	●
Express – New Routes	---	●	---	●
Express – Increased Frequency	---	●	---	---
Arterial BRT – New Routes	---	●	●	●
Arterial BRT – Increased Frequency	---	---	---	---
HCT Peak Period – New Routes	●	---	●	●
HCT All Day – New Routes	---	---	---	●
HCT All Day – Route Extensions	●	●	●	●

Source: HDR Engineering Inc., 2010.

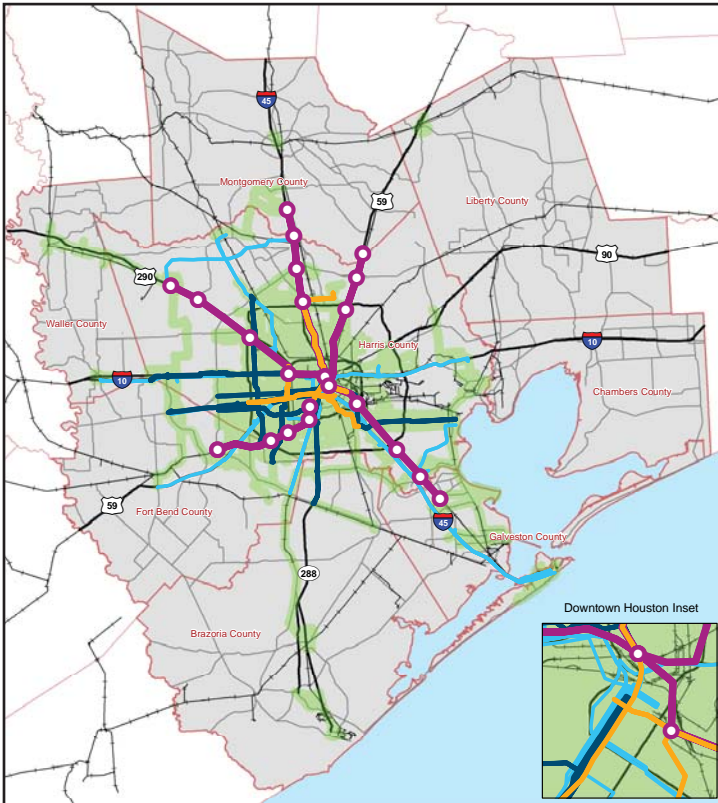
## Scenario 1



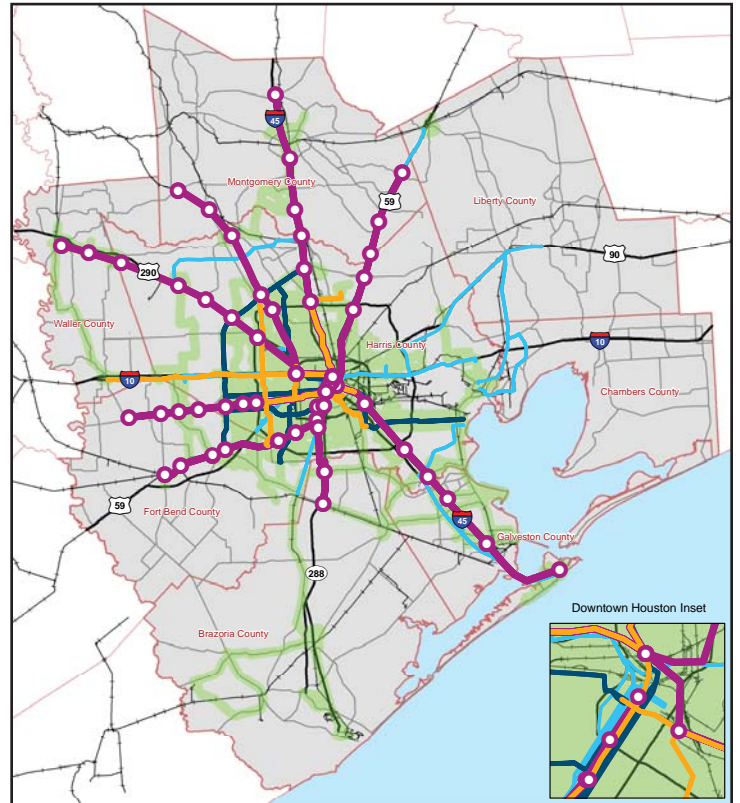
## Scenario 2



## Scenario 3



## Scenario 4



## Legend

- HCT Peak Stops
- HCT Peak
- HCT All Day
- Arterial BRT
- Express Bus
- Local Bus Coverage
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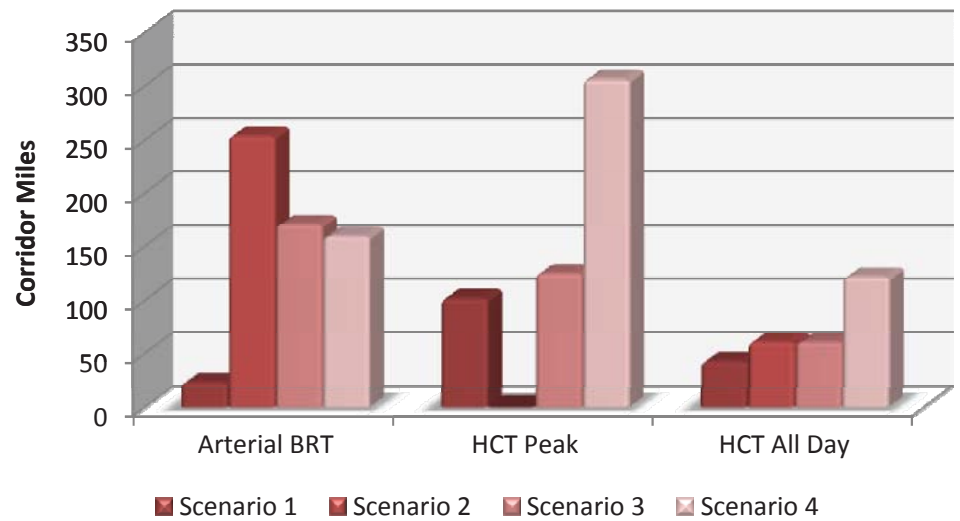
**Scenario 1**, the most basic of the four scenarios, is designed to illustrate the potential benefits of continuing the current rate of transit investment in the region through year 2040. While this scenario produces the least amount of estimated patronage, it has the lowest level of financial investment required.

**Scenarios 2 and 3** also assume the extension of existing revenue, but require new funding sources equivalent to about a 25% increase in existing regional dedicated transit revenues. Scenario 2 focuses on investing additional resources to extend transit access to the greatest number of people in the region and includes an emphasis on the implementation of premium bus services such as commuter express and Bus Rapid Transit (BRT), while the objectives of Scenario 3 includes expanding the transit service area less aggressively to provide more intensive transit services within the region's highest demand corridors and activity centers.

**Scenario 4** provides an unconstrained look at how the region might address future transit needs without consideration to available funds. This scenario includes the most significant investments in high capacity transit solutions for the region and correspondingly produces the highest estimated transit patronage; however, it is not as efficient as scenarios 2 and 3, in regards to projected cost per boarding.

The investments made in Scenario 2 generate approximately 75,000 additional boardings compared to Scenario 1. Scenario 3 generates nearly 125,000 additional boardings compared to Scenario 1. Scenario 4 generates 275,000 additional boardings over Scenario 1.

### Comparison of Transit Corridor Miles by Mode



Source: H-GAC Project Team, 2010.

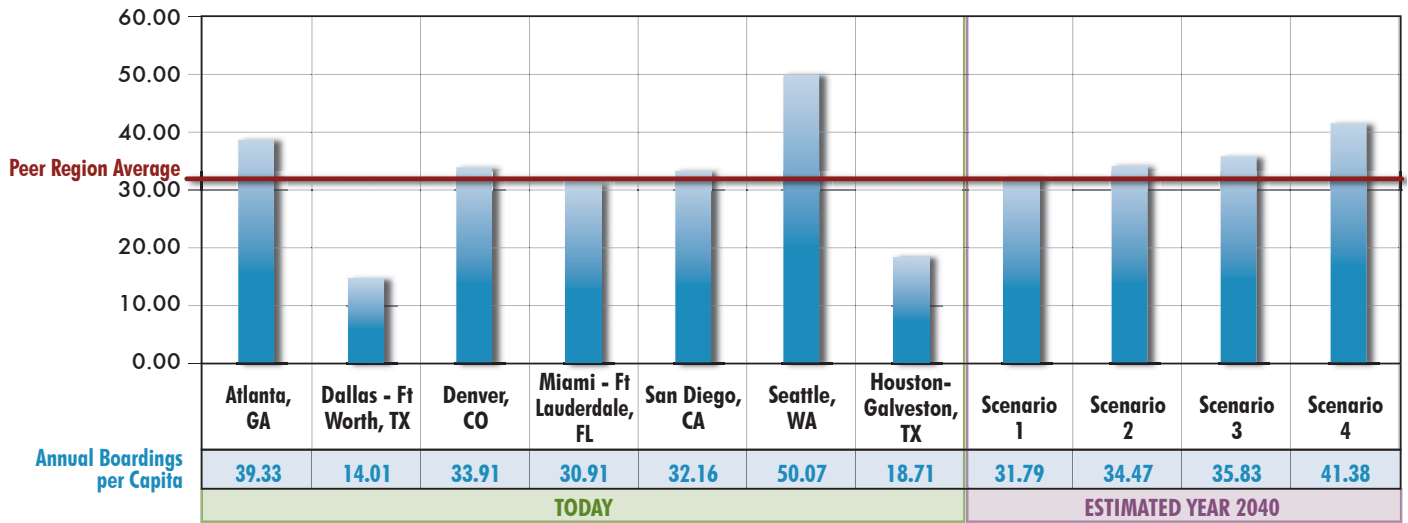
### Transit Performance by Scenario

Performance Measure	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Ridership (Daily)	923,000	1,001,000	1,041,000	1,202,000
Ridership (Peak)	556,000	578,000	659,000	787,000
Boardings/Revenue Mile (Daily)	3.43	3.09	3.81	3.84
Boardings/Revenue Mile (Peak)	3.53	2.99	4.31	4.37
% change in daily ridership compared to scenario 1	---	8.4%	12.7%	30.2%
% change in peak ridership compared to scenario 1	---	3.9%	18.5%	41.6%

Source: HDR Engineering Inc., 2010.

The average boardings per capita from the six peer regions (excludes the Houston-Galveston region) is 31.45. Today, the Houston-Galveston region is below the peer region average; however, all four of the transit scenarios are at or above this average. The investments in Scenarios 2 and 3 would put the Houston-Galveston region at a level similar to the Denver region, and the investments in Scenario 4 would put the Houston-Galveston region, above all of the peer regions, with the exception of the Seattle.

## Annual Boardings per Capita



Source: National Transit Database, 2007; H-GAC, 2010.

## SCENARIO COSTS

The Regional Transit Framework Study transit scenarios were developed based on the region's needs and deficiencies, as well as other considerations including regional connectivity and integration with other transit services. Expenditures or costs were another factor in determining the transit services and capital investments for each scenario. Scenarios 1 and 3 have approximately 33% of all expenditures dedicated to capital investments. The focus on expanding bus services throughout the region in Scenario 2 reduces the emphasis on developing capital infrastructure; therefore, this scenario has the lowest level of capital investment representing only about 22% of total expenditures. With the significant expansion of HCT services in Scenario 4, it has the largest level of capital investment of any of the scenarios representing about 40% of total expenditures.

## Comparison of Estimated Expenditures by Scenario

Costs	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Capital (2015-2040)	\$9.6 Billion	\$7.8 Billion	\$10.5 Billion	\$21.0 Billion
Operations & Maintenance - O&M (2015-2040)	\$18.9 Billion	\$25.7 Billion	\$22.6 Billion	\$28.2 Billion
Total Cost (O&M + Capital)	\$28.5 Billion	\$33.5 Billion	\$33.1 Billion	\$49.2 Billion
Gross Operations Cost Per Boarding	\$2.64	\$3.30	\$2.79	\$3.03

Source: HDR Engineering Inc., 2010.

## FUTURE PLANNING NEEDS

Developing a regional public transportation vision will help keep the people and economy of the region moving in step with the projected growth to come. The Regional Transit Framework Study includes four conceptual scenarios that provide alternative visions for addressing the region's rapidly growing public transportation needs, and The Framework Study represents the first step in developing the region's long-range vision for public transportation. Regional consensus on a preferred scenario and several other elements such as service prioritization, funding, governance, and operational capacity are necessary to advance the region's public transportation vision from concept to reality.

