Florida Five-Year Statewide Transit Development Concepts: A Policy Driven Planning Approach

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Abstract

Florida has taken a unique approach to planning in response to a stated transportation policy that defines a larger role for public transit in the state's future. The Florida Department of Transportation (FDOT) contracted with the Center for Urban Transportation Research (CUTR) to produce a concept plan that examines what that role might be. Florida Five-Year Statewide Transit Development Concepts breaks new ground in that it departs from traditional approaches to meeting transportation needs. Concepts is a policy- driven document, strategic in nature – not a plan that presents detailed, project-specific elements, but one that offers a range of possible alternatives for the future.

These alternatives are presented as six scenarios: the Trend Scenario projects a continuation of statewide transit growth; the Bottom-Up Scenario reflects local community desires; the Coverage Scenario establishes minimum geographic coverage and transit service levels for urbanized areas; the Modal Split Scenario targets increasing transit's share of local travel; the Corridor-Congestion Scenario defines transit needs to relieve congestion in major urban corridors; and the Peer Scenario outlines how Florida can keep up with other states.

This paper describes the policy and planning context under which Concepts was undertaken; the process of selection of the scenarios; a summary of the impacts of each scenario; and a discussion comparing the trade-offs between them. A discussion of basic assumptions precedes the reviews of the scenarios. Impacts including capital and operating costs, vehicle requirements, and anticipated changes in ridership are examined. The paper concludes with a discussion of how FDOT is using Concepts as it moves ahead to further develop a strategic public transportation plan, and a discussion of the potential applicability of this approach in other contexts.

The Center for Urban Transportation Research (CUTR), under contract to the Florida Department of Transportation (FDOT), set out to provide a rational way to characterize estimates of the need for public transportation that would be useful to policy makers. The project team, in consultation with the client, developed a concept plan which addresses needs in the context of six different scenarios. Each scenario was designed to address public transportation needs in terms of a particular goal for public transportation.

This paper summarizes the results of this conceptual study of statewide transit service needs. The study uses alternative scenarios for estimating needs and details the analytical approach for developing each scenario. The study, "Florida Five-Year Statewide Transit Development Concepts," is documented in a technical report and an Executive Summary. This study contributed to thought-provoking discussions of new ways to think about the role of transit.

The Policy and Planning Context

A major reexamination of what transportation is and what it is intended to accomplish has been taking place all across America over the past decade. The policies and practices of the past half

century emphasized highway transportation. These policies and practices have been challenged as rising social and economic costs — evidenced by growing congestion, deteriorating air quality, and the decline of central cities — have extracted a heavy toll and led to a search for alternative approaches to meeting transportation needs. The overriding new approach has been to emphasize moving goods and people instead of vehicles, a recognition that various modes of transportation all have roles to play and that these modes need to be integrated into a functioning intermodal system. Transit can contribute to the intermodal system by providing basic mobility for persons who do not have other means of transportation and as an alternative to the automobile for those who have a travel choice. Societal benefits of reducing roadway congestion, improving air quality, decreasing fuel imports, slowing the demand for additional street and road capacity, and enhancing the mobility of those with limited travel options can all result from increased use of transit.

While not traditionally considered a strong transit market, Florida's extent of urbanization and the rate of growth provide a favorable setting for increased transit use. The lack of job concentration in downtown locations has made transit use for commuting less attractive in Florida than in many other states. A review of Florida's demographics reveals Florida urbanized areas (UAs) contain a lower level of non-whites than the U.S. (18 percent vs. 25 percent), and over 18 percent of all persons living in Florida's urbanized areas are age 65 and over. Florida is similar to the U.S. in poverty level and mobility limitation, with approximately 10 percent of households in Florida not having a vehicle available, compared to 14 percent in the U.S.

The concept of a new and broader role for public transportation is reflected in several legislative, policy, and program actions at the federal and state levels. The multimodal emphasis of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) epitomizes new trends in transportation policy thinking. The State's role in transit in Florida was expanded in 1989 with the creation of the Public Transit Block Grant Program, which carries with it the requirement that each recipient prepare an annual five-year Transit Development Plan (TDP). New directions have also been made clear in policy statements from the Florida Department of Transportation (FDOT) and the Florida Transportation Commission (FTC), which have emphasized public transportation as an alternative to the use of automobiles on Florida's highways and streets. Among the statements that have been expressed are the following:

- Florida residents and visitors should have travel options in addition to the automobile.
- Florida cannot build its way out of highway congestion solely by adding roadway capacity.
- Transit should play a greater role in meeting future transportation needs in Florida.
- Transportation and land use should be coordinated, and transit-oriented land use encouraged.

New policies in Florida support an enhanced role for public transit such as the FDOT policy to limit Interstate highways to a maximum of ten lanes, four of which will be exclusive lanes for use by high occupancy vehicles (HOV) including transit.

The Present Role of Transit Service in Florida

In 1993 nearly 173 million transit trips were made on the 19 transit systems that operate in 16 of Florida's 29 urbanized areas (UAs), plus the city of Key West. Local fixed route bus transportation is the backbone of transit in Florida. Rapid or heavy rail, commuter rail, and automated guideway modes are also represented. Demand responsive services are also offered to the general

public by some transit operators. All transit systems are publicly owned and receive capital and operating assistance from local, state, and/or federal funds. Transit ridership has increased from 129 million trips in 1983 to over 173 million trips in 1993. Florida's transit systems operated 2,122 buses and 185 rail cars in 1993. These systems employed over 5,500 employees and had operating expenses in excess of $374 million. Per capita transit ridership in Florida urbanized areas lags behind other Sunbelt states like Arizona and Texas and is about one-third that of California and Georgia, ranging from 2.8 in Bradenton to 52.6 in Miami. Transit vehicles operate less frequently, over longer routes, and for fewer hours per day, providing less transit service per capita in Florida than in other states of similar demographic characteristics.

Defining Public Transit Cost Elements

Defining what public transportation is as it relates to the need study is a critical consideration. The Florida study discussed in the remainder of this paper did not include consideration of guideway investments. This reflected the fact that the time frame for the study was only five years, and the lowest cost basis for service expansion in Florida will most often be additional bus service. Other strategies for needs estimation might involve making determinations of whether or not to include guideway investments in the needs forecasts.

The Needs Scenarios

The study methodology involved constructing a series of six alternative scenarios, each based on a strategy for achieving a particular goal for transit. Each of the six scenarios is developed for the five-year period from 1995 through 1999. The strategy applied for each scenario is explained, as is the level of transit service to be provided, and the costs. Finally, a comparison is made between the six scenarios.

Four of the scenarios: Coverage, Modal Split, Corridor Congestion, and Peer, assume fundamental changes in the level of transit service supplied in Florida and set targets for such changes. The Trend and Bottom-Up scenarios do not assume fundamental changes in transit service levels. For the four target level-of-service scenarios (Coverage, Modal Split, Corridor Congestion, and Peer), basic assumptions include:

- The level-of-service increases are implemented uniformly during from 1995 to 1999.
- The only capital requirements are the costs of additional buses necessary to reach the target levels of service.
- The scenarios assume all increases in the supply of transit services will be in terms of fixed-route service and will occur in urbanized areas.

Scenario 1: Trend Scenario. This scenario extends existing statewide trends for operating costs, capital costs, number of buses, and passenger trips for Florida's transit operators through 1999. These projections are developed from Section 15 data on transit supply, passenger trips, revenues, and expenses for the years 1985 through 1993, and indicate what might be expected to take place if conditions remain the same as in the past nine years. Table 1 presents the capital and operating costs, number of buses, and passenger trips projected by the Trend Scenario.

The major strength of the Trend Scenario is its empirical basis and objectivity. A disadvantage is that specific transit system projections may become obsolete given a major change in an external

Table 1: Trend scenario projections, 1995-1999

Plan Year	1995	1996	1997	1998	1999	Five-Year Total
Operating Expense	$400	$420	$441	$461	$482	$1,880
Total Expense	$607	$562	$566	$567	$589	$2,477
Total Buses	2,217	2,285	2,353	2,421	2,489	n/a
Passenger Trips (millions)	175	180	186	191	197	n/a

Note: Costs in millions of 1993 dollars.

factor such as expansion of a transit system or the elimination of services to an area.

Scenario 2: Bottom-Up Scenario. This scenario consolidates local community needs and wishes as expressed through Transportation Development Plans (TDPs) developed for the 19 transit systems operating in urbanized areas and in Key West. FDOT requires each recipient of state transit assistance funds to prepare a five-year transit development plan. Local transit systems project needs and demand in their service areas.

Although local agencies are most familiar with the need and demand in their service areas, inconsistencies between TDPs exist because of various attitudes, goals, and objectives of the transit operators. For example, TDPs differ greatly between systems with expansion plans and those expecting to maintain the status quo. Because transit agencies are allowed great flexibility in determining local demand for transit, it is extremely difficult to produce meaningful statewide totals from individual TDPs. Nonetheless, the TDPs do indicate a magnitude of locally preferred services and what those might cost. This scenario presents the costs of attaining local desires and needs aggregated to the statewide level.

This scenario is particularly interesting in that it is both common as a means of estimating needs, and potentially controversial. Numerous advocates argue that the best indicator of need is the local constituency; and, that those who will use, operate and pay to support the transit service are the right audience to ask about needs. A broadly held perception of needs at the local level is probably a good indicator of the market's willingness to support service. In an era where public participation in the planning process plays a role in shaping transportation policies and priorities, this method may result in plans well grounded in the pragmatic and political realities of the day. However, the bottoms up approach typically emanates from the transit community, and offers those with a vested interest in service expansion a major role in determining future needs. Table 2 displays the operating costs, capital costs, and number of buses as summed from the various local TDPs.

Scenario 3: Coverage Scenario. This scenario targets thorough transit coverage of Florida's urbanized areas. The Coverage Scenario is based on the premise that to effectively penetrate the discretionary travel market, transit must offer the maximum opportunity for trips desired by an individual. This requires frequent service and good geographic and temporal coverage of the urban area.

Several assumptions have been made in developing this scenario. A minimum residential density of 3000 persons per square mile is generally recognized as necessary to support fixed- route tran-

Table 2: Bottom-Up scenario projections, 1995-1999

Plan Year	1995	1996	1997	1998	1999	Five-Year Total
Operating Expense	$564	$626	$672	$803	$877	$3,006
Total Expense	$1,182	$1,334	$1,392	$1,347	$1,391	$5,675
Number of Buses	2,427	2,671	2,897	3,117	3,300	n/a
Passenger Trips (millions)	198	224	249	274	300	n/a

Note: Costs in millions of 1993 dollars.

Table 3: Network coverage

Service Category	Population Density (Persons per square mile)	Network Coverage (Route miles per square mile)
I	3,000 - 5,999	12
II	6,000+	16

sit service (Pushkarev and Zupan). Another assumption is that people are not willing to walk more than 1/4 mile to a transit stop. Therefore, a hypothetical accessibility network is superimposed on those portions of each urbanized area where census tract population density exceeds the minimum threshold. To provide maximum transit options, the hours of service are standardized for all systems to a minimum 5:30 am to midnight service, seven days a week. The hypothetical network provides for minimum route coverage with ½ mile separations. As seen in Table 3, route density increases as population density rises from Service Category I (3,000 to 5,999 persons per square mile) to Service Category II (6,000+ persons per square mile). In service category two, off-peak route frequency increases to 15 minute headways from 30 minute headways in Service Category 1. Both service categories have 15 minute peak period headways.

Application of the Coverage Scenario involves constructing hypothetical transit networks for each urbanized area, determining the amount of vehicle miles needed to provide the service described above, identifying the number of buses needed to offer that service, and then calculating operating and capital costs (Table 4).

The major advantage of the Coverage Scenario is that it provides a standardized methodology for examining transit needs that can be applied to urban areas to establish a common level of service.

Table 4: Coverage scenario projections, 1995-1999

Plan Year	1995	1996	1997	1998	1999	Five-Year Total
Operating Expense	$655	$942	$1,251	$1,582	$1,939	$5,347
Total Expense	$979	$1,213	$1,502	$1,825	$2,188	$6,496
Number of Buses	2,632	3,142	3,652	4,162	4,672	n/a
Passenger Trips (mil.)	222	270	319	367	416	n/a

Note: Costs in millions of 1993 dollars.

Table 5: Modal Split scenario, high projections, 1995-1999

Plan Year	1995	1996	1997	1998	1999	Five-Year Total
Operating Expense	$454	$523	$597	$676	$760	$2,552
Total Expense	$682	$695	$746	$812	$899	$3,264
Number of Buses	2,282	2,442	2,602	2,762	2,922	n/a
Passenger Trips (millions)	193	213	233	253	273	n/a

Note: Costs in millions of 1993 dollars.

The target service levels are considerably higher than those currently offered by most Florida transit systems, but consistent with those provided in many other North American cities.

Scenario 4: Modal Split Scenario. A shift of travel from automobiles to transit is an important strategy in reducing congestion, improving air quality, and reducing the demand for additional roadway capacity. Implementing such a shift is the main goal of the Modal Split Scenario. The success of such a shift may be measured by the transit modal split—the percent share of person trips made by transit in a given area.

The Modal Split Scenario is based on the assumption that current transit modal splits are low in Florida; that they can be improved; and that improving transit modal splits can be done by establishing various targets and providing enough resources to attain those targets. At the urbanized area level, only 2.3 percent of Florida workers use transit as their journey to work mode. Higher population and employment densities, lower automobile ownership, higher level of transit services, historical trends, and other factors all contribute to transit mode splits.

A reasonable approach to increasing transit modal split is to set targets. Once targets are established it is possible to measure the number of vehicles and the amount of capital costs and operating expenses needed to attain those targets. This scenario established a range of targets for total travel and for the journey to work portion for each urbanized area: Low - maintain the current transit mode split, Middle - a 25 percent increase in transit share, and, High - a 50 percent increase over the current level.

Estimates of capital and operating resources necessary to attain the targets are provided for each urbanized area for the target year 1999 and totaled. Estimates of operating expenses are based on the person trips and the transit vehicle miles needed to attain target levels. For the journey to work, the number of peak period buses and their capital costs are estimated for the five-year period. Table 5 presents operating expenses, capital costs, and the number of buses necessary to attain the transit modal split targets by 1999.

A strength of this scenario is that it sets very specific goals for the mode share transit can be expected to achieve in an urbanized area. The scenario is consistent with FDOT's policy of an expanded role for transit and is also consistent with the emerging strategies for shifting travel from automobiles to transit. These policies are appearing in state and local transportation plans elsewhere—notably in Oregon, Washington, and in some urbanized areas in California. Uncertainty in attaining targets is the main limitation of this scenario. Even if the capacity is provided to attain the targets, there is no assurance the desired shift of travel from automobiles to transit

would take place. Low density sprawl in many Florida urbanized areas is not conducive to transit use.

Scenario 5: Corridor Congestion Scenario. The goal of this scenario is to relieve congestion in Florida's urban corridors. A shift of travel from automobiles to transit is an important strategy in reducing congestion, improving air quality, and lowering the demand for additional roadway capacity. The scenario is supportive of FDOT policy statements promoting a greater role for transit. The Corridor Congestion Scenario provides a strategy for improving roadway level of service in critical corridors. The strategy is to increase transit capacity to allow a reduction in the number of automobile trips, thereby improving the level of service to an acceptable target.

Development of this scenario included the selection of the one or two most congested corridors in urbanized areas with such congestion. A total of 36 corridors from 23 urbanized areas were identified. Only roadway segments that are identified as congested (those operating at the level of service "F") were selected for analysis. For each selected corridor, the incremental transit service frequency was estimated so that the level of service along this corridor was increased to a minimum standard (level of service "D" for 34 corridors and "C" for the remaining 2) by 1999. Once the incremental service frequency was estimated, the incremental operating expenses were calculated and the number of buses and capital cost for the five years were determined for the selected corridors in the 23 urbanized areas, then summed to obtain a state total. Table 6 presents the cost estimates for phasing in the service level requirements over the five years of the plan.

A major benefit of this scenario is that it sets a specific goal for what transit can be expected to do in helping to secure the minimum level-of-service standard in congested corridors in urbanized areas. This scenario is consistent with FDOT's policy of an expanded role for transit in Florida's urban areas, and with emerging strategies for shifting travel from automobiles to transit. Similar to the mode split scenario, the main limitation of this scenario is that there is no guarantee that the desired extent of shift from automobiles to transit would take place.

Scenario 6: Peer Scenario. This scenario examines how Florida compares with other states in providing transit services, and how these are used. Comparison can help determine if an increased role for transit is a reasonable expectation. Experiences of other states may indicate if transit in Florida has maximized its potential, or whether additional investment in transit is needed. Examination of peer states demonstrates there is opportunity for expanded transit service, and information gleaned from the experience of others is used to develop a scenario to maximize that opportunity.

Table 6: Corridor Congestion scenario projections, 1995-1999

Plan Year	1995	1996	1997	1998	1999	Five-Year Total
Operating Expense	$688	$1,010	$1,356	$1,729	$2,129	$5,798
Total Expense	$995	$1,264	$1,591	$1,953	$2,360	$6,874
Number of Buses	2,663	3,114	3,565	4,016	4,467	n/a
Passenger Trips (mil.)	251	328	406	483	561	n/a

Note: Costs in millions of 1993 dollars.

Eight states were selected as "peers." Arizona, California, Colorado, Georgia, Texas, and Washington were carefully chosen for demographic characteristics, economic base conditions, and/or growth trends similar to Florida. Ohio and Pennsylvania reflect older urban patterns and have a longer, more continuous transit history.

The role of transit was examined through the use of Federal Transit Administration (FTA) Section 15 reports for 1992 and other material from the U.S. Census and the Nationwide Personal Transportation Survey (NPTS). Transit supply and utilization were examined in each of the nine states (Florida plus the eight peers) and all of the included census-designated urbanized areas. Transit supply includes network and fleet size, vehicle miles and hours, and other measures. Ridership is the principal measure of transit use. Costs of providing the transit service and farebox and other revenues are also considered.

The Peer Scenario is presented in two parts. The first is the comparative analysis of Florida and the eight peers at both state and urbanized area levels. This discussion begins with general demographic and other characteristics related to transportation and proceeds to the supply and use of transit. The second part develops a future scenario for Florida that might be achieved by offering a level of transit service approximating that of the peer states. Table 7 presents an overview of some of the general characteristics of Florida and the eight peer states. In comparison to the peer states, Florida ranks second in percent of population living in UAs, third in statewide population density, and first in autos per 1,000 population.

Transit supply shows considerable variation from state to state and among the urbanized areas in the nine states. The most obvious indicator of transit supply is simply the presence or absence of transit service. In comparison to the peer states, Florida has the lowest percentage of UAs provid-

Table 7: Peer state general characteristics

State	Population (millions)	# of UAs	Population in UAs (millions)	Population in UAs	Population Density	Land Area (sq. miles)	Annual Population Growth (1960-1990)	Annual Population Growth (1980-1990)	Population 65 and older	Population Below Poverty Level	Autos per 1000 Population
Arizona	3.7	3	2.7	72.9%	32.3	114,006	6.0%	3.5%	13.1%	13.5%	540
California	29.8	33	25.3	84.9%	190.8	163,707	3.0%	2.6%	10.6%	12.5%	560
Colorado	3.3	7	2.3	70.6%	31.8	104,100	2.9%	1.4%	9.8%	11.7%	640
Florida	12.9	24	10.2	78.7%	239.6	65,758	5.4%	3.3%	18.0%	12.7%	700
Georgia	6.5	10	3.3	51.2%	119.9	59,441	2.1%	1.9%	10.1%	14.7%	580
Ohio	10.9	16	6.9	63.3%	264.9	44,828	0.4%	0.0%	12.8%	12.5%	650
Pennsylvania	11.9	16	8.5	71.8%	265.1	46,058	0.2%	0.0%	15.1%	11.1%	540
Texas	17	32	11.3	66.6%	64.9	268,601	2.6%	1.9%	10.1%	18.1%	500
Washington	4.9	10	3.2	66.1%	73.1	71,303	2.4%	1.8%	11.9%	10.9%	590

Source: U.S. Department of Commerce, Bureau of the Census, 1990 Census of Population.

Table 8: Peer scenario projections, 1995-1999

Plan Year	1995	1996	1997	1998	1999	Five-Year Total
Operating Expense	$433	$479	$515	$557	$601	$2,198
Total Expense	$657	$647	$660	$689	$735	$2,894
Number of Buses	2,269	2,416	2,563	2,710	2,857	n/a
Passenger Trips (mil.)	180	187	195	202	209	n/a

Note: Costs in millions of 1993 dollars.

Table 9: Scenario comparison

Plan Year	1995	1996	1997	1998	1999	Five-Year Total
Total Expense						
Trend	$607	$562	$566	$567	$589	$2,477
Bottom-Up	1,182	1,334	1,392	1,347	1,391	5,675
Coverage	979	1,213	1,502	1,825	2,188	6,496
Modal Split	682	695	746	812	899	3,264
Corridor Congestion	995	1,264	1,591	1,953	2,360	6,874
Peer	657	647	660	689	735	2,894
Passenger Trips (millions)						
Trend	175	180	186	191	197	n.a.
Bottom-Up	198	224	249	274	300	n.a.
Coverage	222	270	319	367	416	n.a.
Modal Split	193	213	233	253	273	n.a.
Corridor Congestion	251	328	406	483	561	n.a.
Peer	180	187	195	202	209	n.a.

Note: Costs in millions of 1993 dollars.

ing transit service. Per capita transit trips are compared at both the statewide and urbanized area levels. Overall transit use in Florida is lower than in the peer states.

The second part of the Peer Scenario is the development of a transit future in Florida that raises the level of service to that of the peer states. Increasing vehicle revenue miles (VRMs) per capita is the service factor used to bringing Florida's public transportation service to peer state levels. Capital costs were estimated based on the number of additional buses necessary to raise Florida's VRMs to peer state levels. Operating costs were estimated by multiplying the cost per vehicle revenue mile by the required additional VRMs. (Table 8).

Comparing the Options

A comparison of costs, number of buses, and passenger trips is presented in Table 9. The operating costs associated with sustaining any of the scenarios beyond 1999 should be recognized as 1999's operating costs plus an adjustment for inflation. Additional capital costs would be required beyond 1999 for replacement of buses and facility improvements. The comparisons in costs are also shown in Figure 1.

Conclusions

The strategy followed in Florida provides a variety of ways of thinking about the needs for public transportation in Florida. The different scenarios give the reader an overall feeling of the magnitude of costs that would be required for public transportation to fulfill a larger role in Florida. This document is not a plan, but a tool for considering how different policy decisions might affect the role of transit in Florida's near-term future. The presentation of these scenarios and their related costs reflect new ways of thinking about the role of transit. Each scenario offers a particular concept for consideration as decision makers weigh transportation options. The methodologies respond to the expanded set of goals set for public transit investments and explores needs in the context of this expanded goal set.

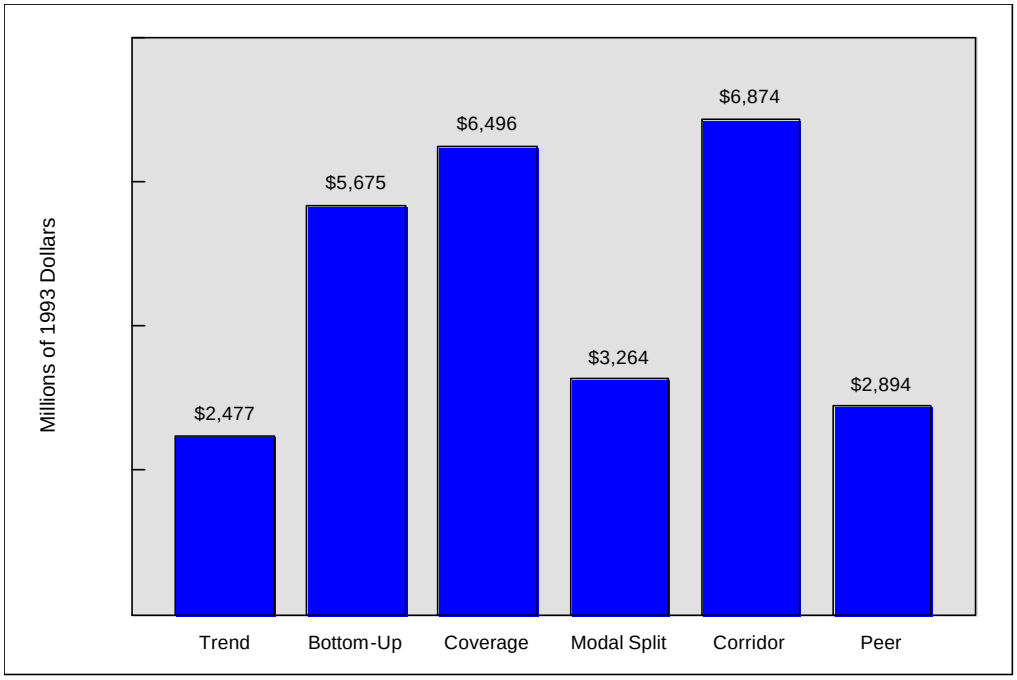

Figure 1: Scenario comparisons

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