

## 6. Paying our way

In this chapter the Plan will highlight the financial implications of investing in the actions previously identified in Chapter 5, “Choosing our path”. The discussion includes the following information for each mode through 2040:

- Costs to maintain and improve the system
- Anticipated future revenues
- Potential shortfall and its implications



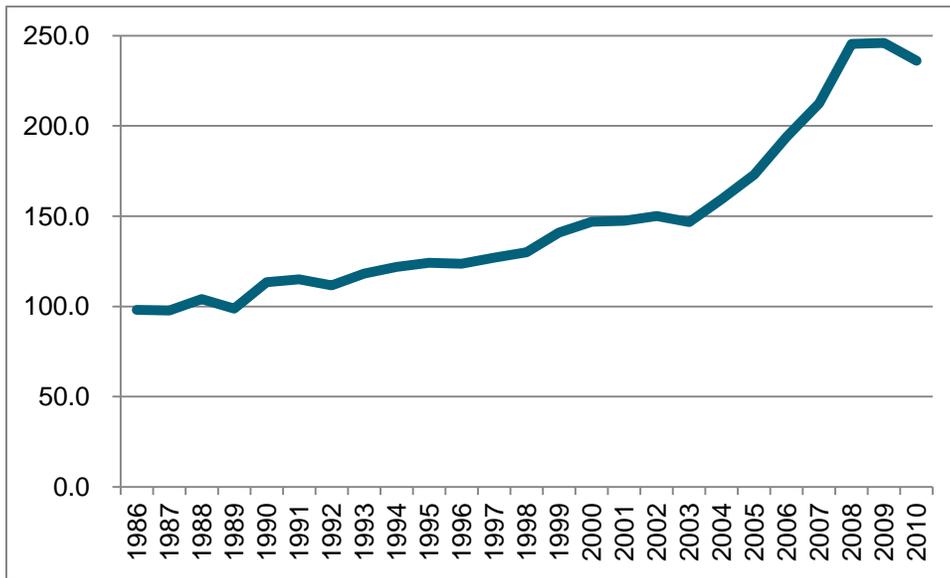
### 6.1 Introduction

The costs and revenues discussion in this chapter is framed primarily within the context of the Iowa DOT’s Five-Year Program, which is the basis for the terms “Iowa DOT costs” and “Iowa DOT revenues” used in this chapter. Both costs and revenues are presented in average annual future year dollars. The most critical piece of information presented in this chapter is the shortfall between anticipated future costs and revenues.

The costs associated with nearly all goods and services, including those in transportation, typically increase over time. The term for this increase in costs over time is inflation, which is often expressed as a rate or index. An oft-referenced index in the transportation industry is the construction cost index, which is shown using Iowa data in [Figure 6.1](#).

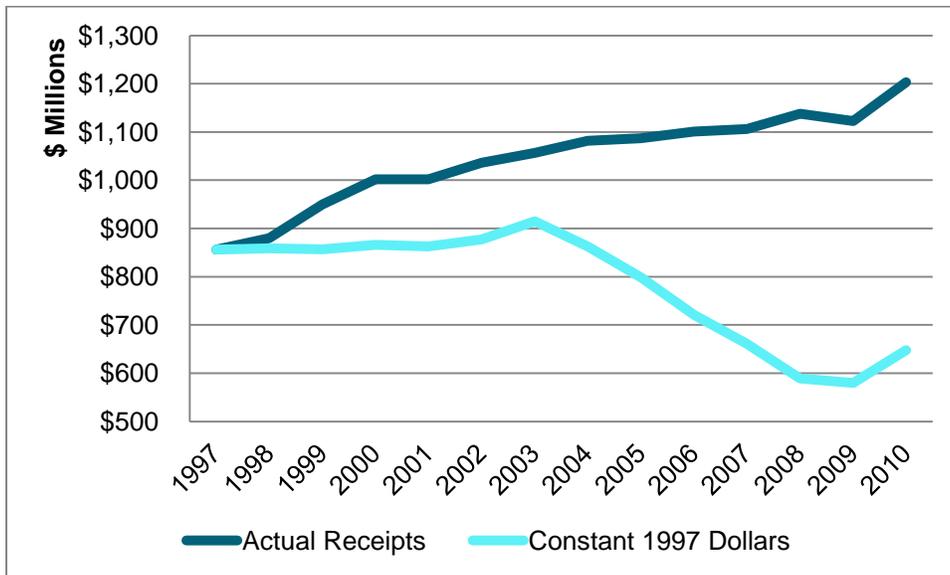
To better illustrate the impacts of this inflation, consider the following: A project that cost \$1 million in the mid-1980s would cost approximately \$2.4 million today. Over time, the effects of cost inflation erode the buying power of available revenue. An example of this is illustrated in [Figure 6.2](#), which shows road use tax fund revenue history adjusted to constant 1997 dollars based on the Iowa construction cost index.

Figure 6.1: Composite Price Trend Index for Iowa Highway Construction (% of 1986 base)



Source: Iowa DOT, Office of Contracts

Figure 6.2: History of Road Use Tax Fund Revenue



Source: Iowa DOT

The impact of increasing costs is compounded by the fact that much of Iowa's revenue stream for transportation construction, maintenance, and operations has remained relatively stagnant. An example of this is Iowa's motor fuel tax, which has effectively remained the same for more than two decades while highway construction costs have increased by nearly 140 percent. In comparison, four of the six states that border Iowa have a higher fuel tax, averaging \$0.27 per gallon.

With transportation costs increasing faster than revenues, Iowa's transportation system will be subject to more widespread deterioration. The level of revenues received is affected by a number of factors, including but not limited to the amount of federal dollars appropriated, vehicle fuel efficiency, and the use of alternative fuels such as ethanol and biodiesel. Regardless, an adequate level of revenue is necessary to support the state's future transportation system and keep Iowa competitive in an ever-changing economy.



## 6.2 Annual transportation funding

**Table 6.1** highlights the budgeted distribution of new transportation funding to the Iowa DOT. Note that these figures do not include federal highway or transit funds administered by the Iowa DOT but transferred to local jurisdictions for local programming authority.

**Table 6.1: Annual Iowa DOT Transportation Funding (\$ millions)**

	Annual average, SFY 2000-2011	SFY 2011
Highway	\$672.826	\$741.986
Aviation	\$3.336	\$4.450
Bike/Pedestrian (Trails)*	\$1.583	\$0
Public Transit	\$11.150	\$12.239
Railroad	\$3.351	\$13.100
General Services**	\$71.899	\$76.006
Motor Vehicle	\$36.219	\$40.659
<b>TOTAL</b>	<b>\$800.364</b>	<b>\$888.440</b>

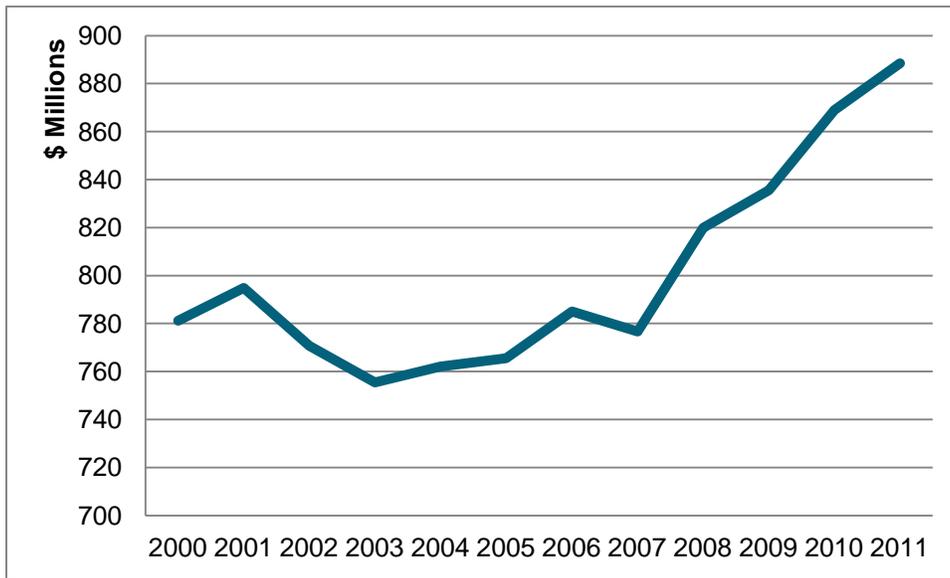
Source: Iowa DOT, Office of Program Management

\*Trails funding does not include Federal Recreational Trails or Statewide Transportation Enhancement funding.

\*\*General Services includes various special purpose operations and capital funding.

**Figure 6.3** illustrates the recent history of total Iowa DOT-programmed transportation funding. While this total has increased at a steady pace in recent years, it cannot fully address the growing list of needs and the escalating costs associated with meeting those needs. **Figures 6.4 and 6.5** highlight the distribution of funds to highways and various non-highway categories.

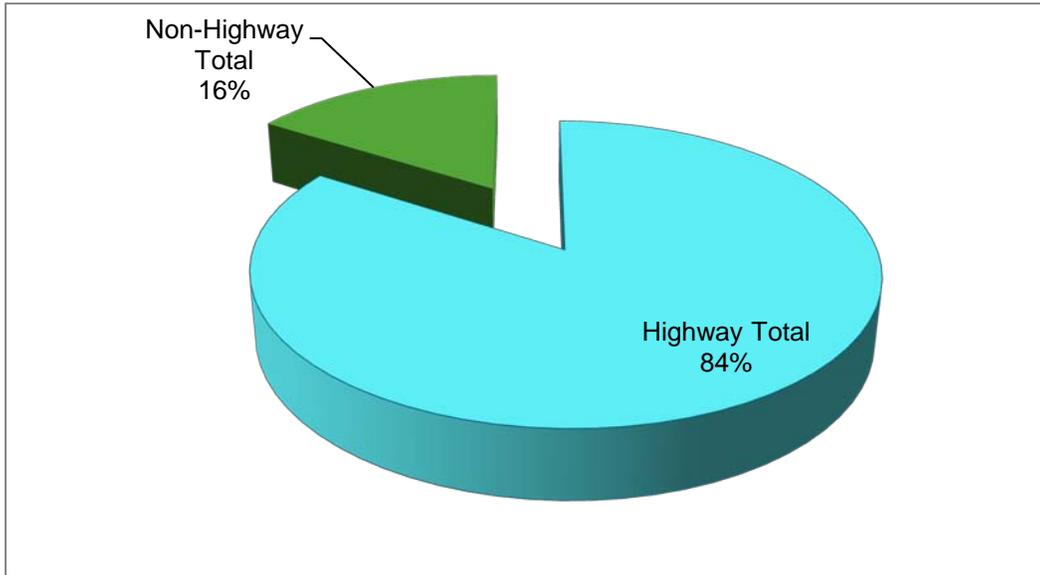
Figure 6.3: History of Total Iowa DOT-Programmed Transportation Funding



Source: Iowa DOT, Office of Program Management

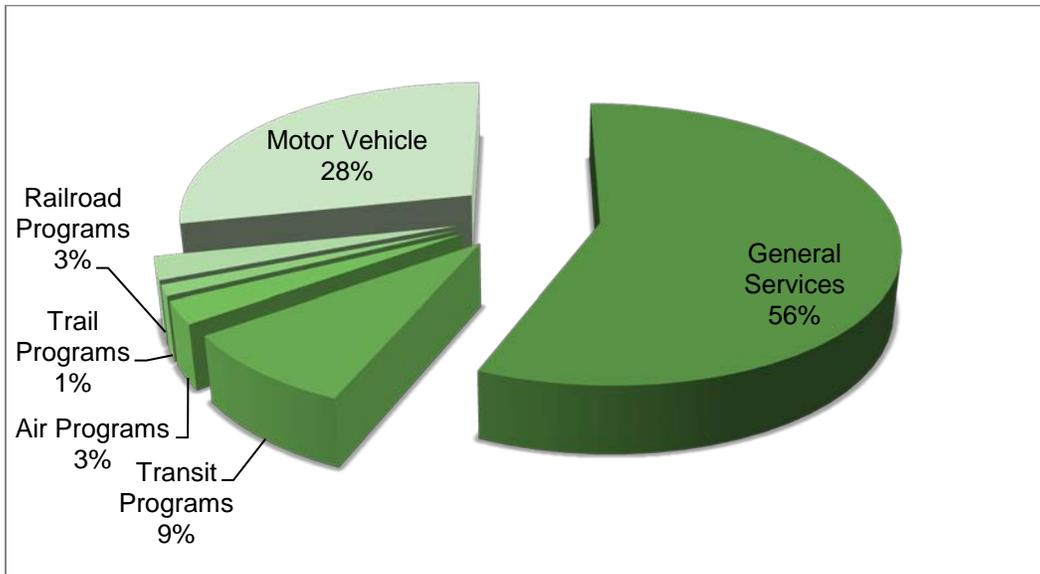


Figure 6.4: Distribution of Iowa DOT-Programmed Transportation Funding (2000-2011)



Source: Iowa DOT, Office of Program Management

Figure 6.5: Distribution of Iowa DOT-Programmed, Non-Highway Transportation Funding (2000-2011)



Source: Iowa DOT, Office of Program Management

## 6.3 Future costs and revenues by mode

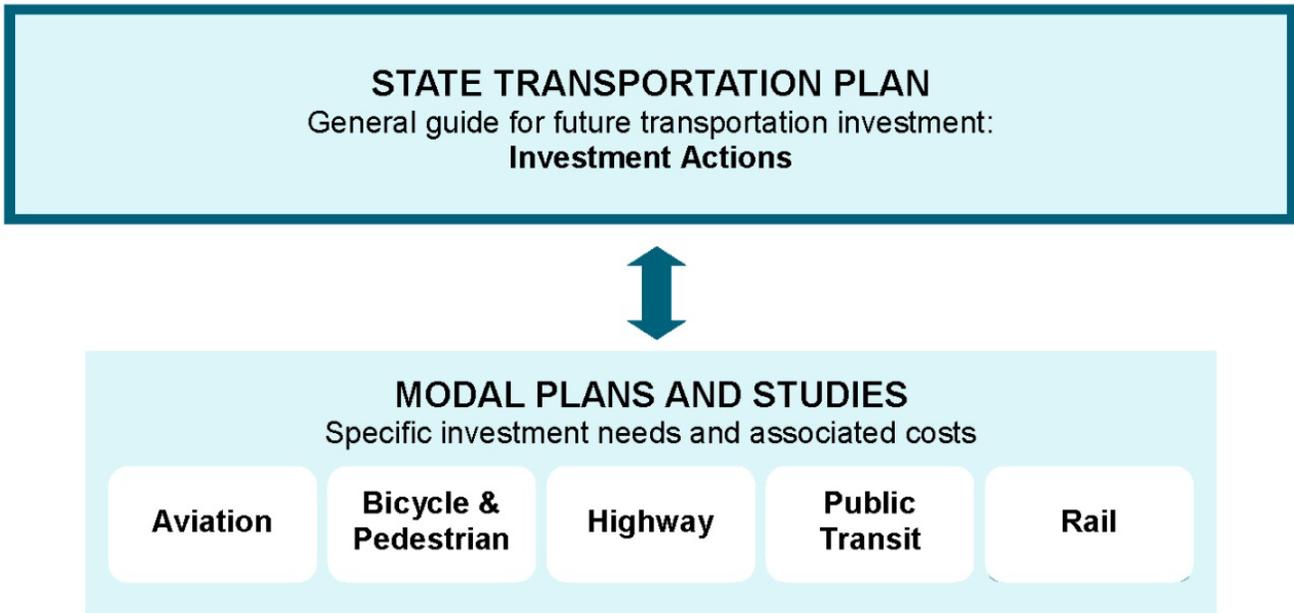
The following pages highlight the cost of the Iowa DOT's future investment in the state's transportation system versus the revenues that are anticipated. As was previously mentioned, this discussion is framed within the context of the Iowa DOT's Five-Year Program, which is the basis for the terms "Iowa DOT costs" and "Iowa DOT revenues" used in this section. Both costs and revenues are presented in average annual future year dollars.

It is important to note that the costs identified in this chapter are not derived directly from the investment actions highlighted in Chapter 5. While the investment actions serve as a general guide for the Iowa DOT's future financial investments, specific costs for each mode were developed from the investment needs identified in the individual modal plans and studies (see [Figure 6.6](#)). These plans and studies are referenced in the following sections.

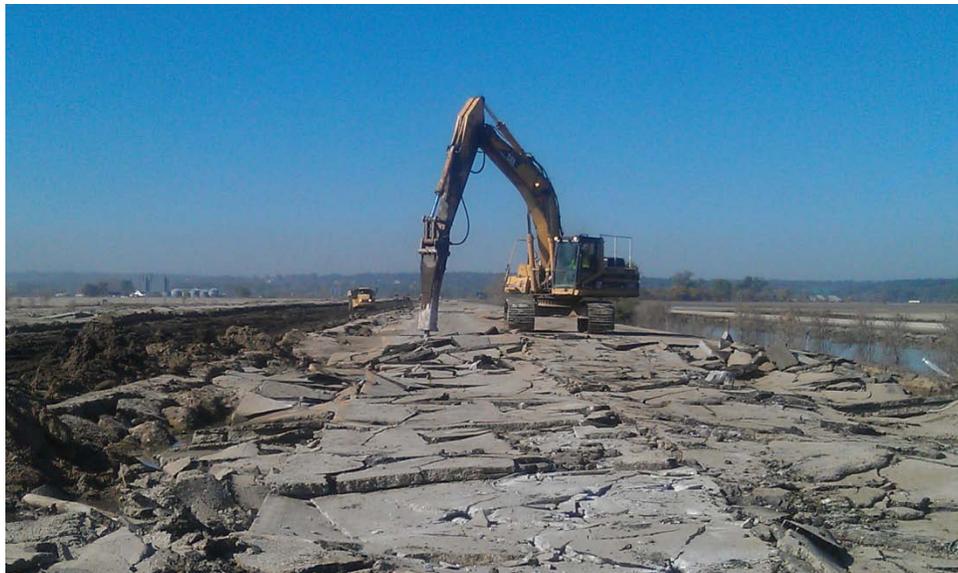
Also, while the focus of this chapter is on Iowa DOT revenues, it should be noted that there are significant sources of revenue for each mode that can be applied towards those costs that exceed or are not eligible for Iowa DOT-programmed funds. Some examples of these revenue sources include, but are not limited to, the following (listed alphabetically):

- **Aviation:** Bonding, Federal Aviation Improvement Program, passenger facility charges, property tax levy
- **Bicycle and Pedestrian:** Local jurisdiction funds, private investment, Resource Enhancement and Protection funds
- **Highway:** Farm-to-Market Road Fund, Secondary Road Fund, Street Construction Fund, federal discretionary funds
- **Public Transit:** Fare box revenue, federal discretionary funds, property tax levy
- **Rail:** Federal discretionary funds, private investment, Railroad Rehabilitation and Improvement Financing

Figure 6.6: Relationship Between Investment Actions and Specific Modal Costs



Source: Iowa DOT



**Aviation**

**Costs**

Costs for aviation were derived from the Iowa Aviation System Plan update (system plan) that was completed in 2011. The system plan identified statewide maintenance and improvement needs that totaled approximately \$816 million over the 20-year planning period, or nearly \$41 million annually (in 2010 dollars). The annual costs for meeting these needs were projected to 2040 using an annual inflation rate of 5.9%, which was based on the growth of Iowa’s construction cost index. **Average annual total costs** over the life of the Plan were then calculated.

To bring these costs into the context of the Five-Year Program, the portion of total aviation costs statewide that has historically been addressed through the Aviation element of the Five-Year Program was examined. (The Aviation element of the Five-Year Program has included State Aviation Fund, Rebuild Iowa’s Infrastructure Fund, and annual appropriation funds.) Between 2005 and 2010, this portion was nearly 7.2 percent. This percentage was then applied to the average annual total costs mentioned above to estimate **average annual Iowa DOT costs** shown in [Table 6.2](#).

**Table 6.2: Aviation Costs (\$ millions)**

	Average annual total costs	Average annual Iowa DOT costs
<b>TOTAL</b>	\$113.406	<b>\$8.122</b>

Source: Iowa DOT

**Revenues**

Revenues for aviation were derived from historical funding identified in the Aviation element of the Five-Year Program. A linear trend line was applied to the historical data from state fiscal years 2000 through 2011 and then projected out to 2040. **Average annual Iowa DOT revenues** ([Table 6.3](#)) over the life of the Plan were then calculated. Note that aviation revenues are largely dependent upon annual legislative appropriations, aircraft registrations, and fuel sales.

**Table 6.3: Aviation Revenues (\$ millions)**

	Average annual Iowa DOT revenues
<b>TOTAL</b>	<b>\$4.939</b>

Source: Iowa DOT

The difference between average annual costs and revenues is illustrated in **Figure 6.7**. As estimated, anticipated revenues would cover approximately 60 percent of the anticipated costs.

**Figure 6.7: Aviation Shortfall**



Source: Iowa DOT

### Implications of the Shortfall

- All objectives related to infrastructure and services may not be met, affecting the ability to address the needs of aviation users.
- Access to aviation services may not be maintained or enhanced, negatively impacting economic development.
- Planning for infrastructure, air space protection, emergency response, and local business development to ensure the most efficient and safe system may be inadequate.

## Bicycle and Pedestrian

### Costs

Costs for bicycle and pedestrian were derived from the statewide trail network envisioned in the Iowa Trails 2000 plan. This 4,908-mile network was expected to be completed by 2056 if the average rate of trail construction at the time (78 miles per year) continued. For the purposes of the Plan, bicycle and pedestrian costs were calculated assuming the remaining portion of the network (approximately 3,300 miles) would be completed by 2060. This would necessitate the construction of nearly 67 miles of trails each year.

With this construction rate in mind, annual costs were calculated using per-mile construction and rehabilitation costs (based on a 20-year life cycle) derived from Iowa Trails 2000. These costs (factored to 2010 dollars) were projected to 2040 using an annual inflation rate of 5.9 percent, which was based on the growth of Iowa's construction cost index. **Average annual total costs** over the life of the Plan were then calculated.

To bring these costs into the context of Iowa DOT costs, the portion of annual statewide trail construction that is supported through the programs mentioned in the following section was used. On average, this portion is approximately 47 percent. This percentage was then applied to the average annual total costs mentioned above to estimate **average annual Iowa DOT costs** shown in [Table 6.4](#).

A similar methodology was used to calculate the costs associated with Iowa's Level 1 trail network, which is a smaller priority subset of the larger Iowa Trails 2000 network. An estimated 540 miles of this 1,230-mile system have been constructed. The costs shown in [Table 6.4](#) assume that the remaining 690 miles will be completed by 2040.

**Table 6.4: Bicycle and Pedestrian Trail Costs (\$ millions)**

	Average annual total costs	Average annual Iowa DOT costs
New construction	\$26.265	-
Rehabilitation	\$54.987	-
<b>TOTAL</b>	\$81.252	<b>\$37.918</b>
<b>Construction &amp; Rehab (Level 1 only)</b>	\$49.177	<b>\$22.949</b>

Source: Iowa DOT

**Revenues**

Revenues for bicycle and pedestrian were derived from historical funding identified in the Trail element of the Five-Year Program (which includes only the State Recreational Trails program) plus Federal Recreational Trails funds, Statewide Transportation Enhancement funds, and Primary Road funds used for on-road accommodations. A linear trend line was applied to the historical data from state fiscal years 2000 through 2011 and then projected out to 2040. **Average annual Iowa DOT revenues** (Table 6.5) over the life of the Plan were then calculated.

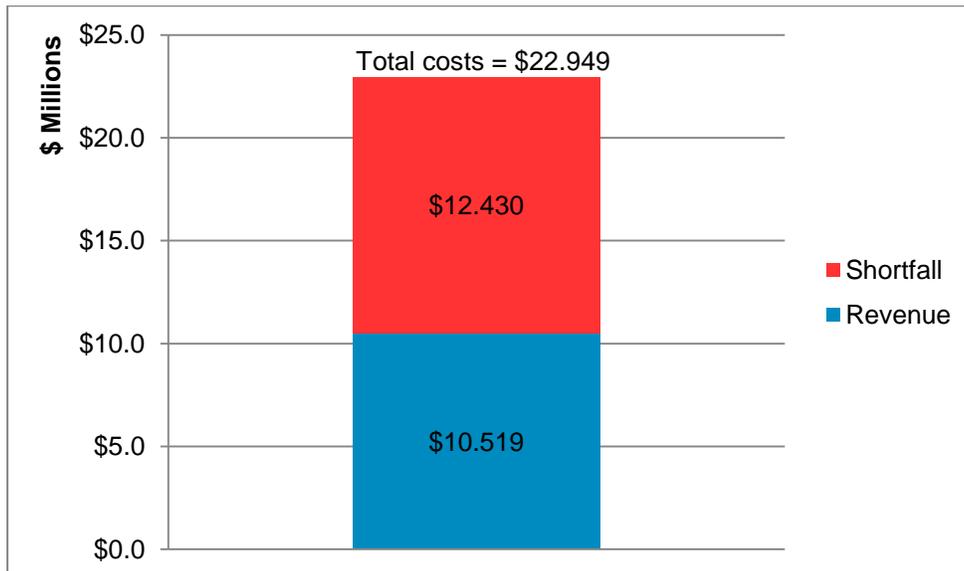
**Table 6.5: Bicycle and Pedestrian Revenues (\$ millions)**

	<b>Average annual Iowa DOT revenues</b>
<b>TOTAL</b>	<b>\$10.519</b>

Source: Iowa DOT

The difference between average annual costs and revenues is illustrated in Figure 6.8. As estimated, anticipated revenues would cover approximately 46 percent of the anticipated costs associated with rehabilitation and Level 1 construction. By comparison, the same revenues would only fund an estimated 28 percent of the costs associated with the larger Trails 2000 network.

**Figure 6.8: Bicycle and Pedestrian Shortfall**



Source: Iowa DOT

### Implications of the Shortfall

- Some trails, including Level 1 trails, may not be built, creating a disconnected and segmented system.
- Some existing trails may not be adequately maintained.
- There may be fewer facilities available to accommodate potential bicyclists and pedestrians for recreational opportunities, adversely impacting health, quality of life, and the state's tourism economy.



## Highway

### Costs

Costs for highway were derived from the Iowa DOT’s 2011 study of roadway needs and Road Use Tax Fund (RUTF) revenues. The study identified both total statewide needs and critical statewide needs, with the critical need level being the amount of funding necessary to meet the most critical pavement and bridge preservation needs on Iowa’s roadways. In addition, the critical need level would partially support the following categories of needs:

- Capacity improvements on high-volume CIN roads
- Reconstruction of high-volume roads with poor pavement
- Repair/replacement of functionally obsolete bridges on high-volume roads
- Repair/replacement of structurally deficient bridges on low-volume roads
- Resurfacing of low-volume roads

Each category of needs (i.e. costs) was provided as both a 20-year total and as an average annual figure. These **average annual costs** were then projected over the life of the Plan.

To bring these costs into the context of the Five-Year Program (i.e., the primary highway system), the portion of statewide needs that can be attributed to the primary highway system was examined. This percentage was then applied to the average annual total and critical costs mentioned above to estimate **average annual Iowa DOT costs** shown in **Tables 6.6 and 6.7**.

**Table 6.6: Total Highway Costs (\$ millions)**

	Average annual total costs	Average annual Iowa DOT costs
<b>TOTAL</b>	\$3,990.000	\$1,911.594

Source: Iowa DOT

**Table 6.7: Critical Highway Costs (\$ millions)**

	Average annual critical costs	Average annual Iowa DOT costs
<b>TOTAL</b>	\$2,580.000	<b>\$1,236.068</b>

Source: Iowa DOT

**Revenues**

Revenues for highway were also derived from the Iowa DOT’s 2011 study of roadway needs and Road Use Tax Fund (RUTF) revenues. Future revenue assumptions for federal formula funds, Road Use Tax Fund (RUTF) revenues, and TIME-21 revenues were applied to fiscal year 2012 funding levels for each of these sources and then projected out to 2040. **Average annual Iowa DOT revenues** (Table 6.8) over the life of the Plan were then calculated.

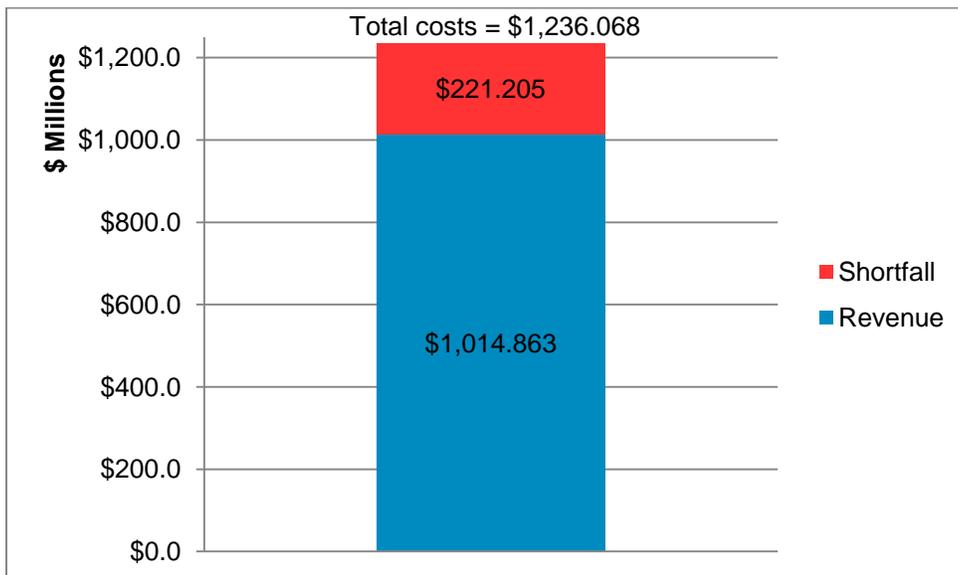
**Table 6.8: Highway Revenues (\$ millions)**

	Average annual Iowa DOT revenues
<b>TOTAL</b>	<b>\$1,014.863</b>

Source: Iowa DOT

The difference between average annual critical costs and revenues is illustrated in Figure 6.9. As estimated, anticipated revenues would cover approximately 82 percent of the anticipated costs.

**Figure 6.10: Highway Shortfall**



Source: Iowa DOT

**Implications of the Shortfall**

- Some improvements on the urban interstate system may not be addressed, which could lead to increased congestion and travel times.
- Some improvements on the rural interstate system may not be addressed, which could lead to poorer pavement conditions.

- Some improvements on the CIN may not be addressed, which could lead to fewer economic development opportunities and slower job growth.
- Some corridor improvements and work on other major projects, including major bridge structures, may not be addressed.
- Future modernization of the existing system will be a challenge.



## Public Transit

### Costs

Costs for public transit were derived from the Iowa Passenger Transportation Funding Study (funding study) that was completed in 2009. The funding study identified annual operating and capital costs for current services offered by the state’s 35 public transit providers, as well as annual incremental costs associated with addressing unmet “baseline” and “choice” demand. For the purposes of the Plan, the costs for meeting the baseline demand were used, which would support both current services and the following statewide improvements:

- Increase service frequency to 30 minutes for small and large urban fixed-route systems
- Expand daily service to 11 PM on weekdays for large urban systems
- Expand daily regional paratransit trips by 90 percent

The total annual costs for meeting baseline demand (identified in the funding study in 2009 dollars) were projected to 2040 using an annual inflation rate of 3.2 percent, which has been the annual inflation in public transit costs over the past decade. **Average annual total costs** over the life of the Plan were then calculated.

To bring these costs into the context of the Five-Year Program, the portion of total public transit costs statewide that has historically been addressed through the Transit element of the Five-Year Program was examined. (The Transit element of the Five-Year Program includes State Transit Assistance and Public Transit Infrastructure Grant funds.) Between 2000 and 2011, this portion was just over 12 percent. This percentage was then applied to the average annual total costs mentioned above to estimate **average annual Iowa DOT costs** shown in [Table 6.9](#).

**Table 6.9: Public Transit Costs (\$ millions)**

	Average annual total costs	Average annual Iowa DOT costs
Capital	\$52.357	-
Operating	\$361.559	-
<b>TOTAL</b>	\$413.916	<b>\$49.902</b>

Source: Iowa DOT

**Revenues**

Revenues for public transit were derived from historical funding identified in the Transit element of the Five-Year Program plus an average annual amount of Iowa’s Clean Air Attainment Program (ICAAP) funding that has been awarded to transit projects over the life of the program. A linear trend line was applied to the historical data from state fiscal years 2000 through 2011 and then projected out to 2040. **Average annual Iowa DOT revenues** (Table 6.10) over the life of the Plan were then calculated.

**Table 6.10: Public Transit Revenues (\$ millions)**

	Average annual Iowa DOT revenues
<b>TOTAL</b>	<b>\$17.708</b>

Source: Iowa DOT

The difference between average annual costs and revenues is illustrated in Figure 6.10. As estimated, anticipated revenues would cover approximately 35 percent of the anticipated costs.

**Figure 6.10: Public Transit Shortfall**



Source: Iowa DOT

**Implications of the Shortfall**

- Slow bus replacement will lead to an aging bus fleet and increasing maintenance costs.
- Future plans for service expansions may be delayed, and some existing services may be eliminated.
- Transit facilities may not be repaired or improved in a timely manner.

**Rail**

**Freight Rail Costs**

Costs for freight rail were derived from an analysis of historical and anticipated costs associated with each of the funding programs managed by the Iowa DOT’s Office of Rail Transportation, which include the following: Federal Rail Grade Crossing Safety, Highway-Railroad Grade Crossing Surface Repair, Primary Road Highway-Railroad Crossing Surface Improvements, Signal Maintenance, and the Rail Revolving Loan and Grant Program. In addition to the costs associated with these programs, an additional \$30 million in annual needs beyond the capacity of these programs was identified. Annual costs, including this \$30 million, were projected to 2040 using an annual inflation rate of 6.2%, which was based on the growth of the Railroad Cost Recovery Index published by the Association of American Railroads. **Average annual total costs** over the life of the Plan were then calculated.

Bringing these costs into the context of the Five-Year Program, as was done with the other modes, was not possible as two of the abovementioned programs are not identified in the Five-Year Program. Instead, the portion of total costs above that could be reasonably addressed through these state-managed programs was examined. This was then applied to the average annual total costs mentioned above to estimate **average annual Iowa DOT costs** shown in **Table 6.11**.

**Table 6.11: Freight Rail Costs (\$ millions)**

	Average annual total costs	Average annual Iowa DOT costs
<b>TOTAL</b>	\$210.068	<b>\$33.203</b>

Source: Iowa DOT

**Freight Rail Revenues**

Revenues for freight rail were derived from historical funding for the five programs mentioned above. A linear trend line was applied to the historical data from state fiscal years 2000 through 2010 and then projected out to 2040. **Average annual Iowa DOT revenues** (**Table 6.12**) over the life of the Plan were then calculated.

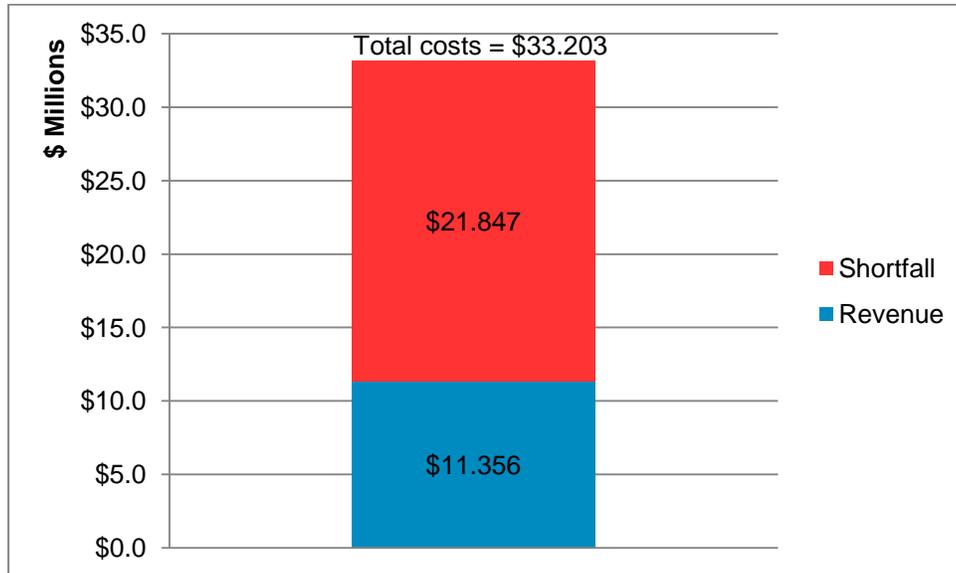
**Table 6.12: Freight Rail Revenues (\$ millions)**

	Average annual Iowa DOT revenues
<b>TOTAL</b>	<b>\$11.356</b>

Source: Iowa DOT

The difference between average annual freight rail costs and revenues is illustrated in [Figure 6.11](#). As estimated, anticipated revenues would cover approximately 34 percent of the anticipated costs.

[Figure 6.11: Freight Rail Shortfall](#)



Source: Iowa DOT

### Passenger Rail Costs

Costs for passenger rail were derived from an analysis prepared for the draft Iowa DOT 10 Year Strategic Passenger-Rail Plan (strategic plan) and include the following route segments:

- Chicago – Iowa City via the Iowa Interstate railroad (IAIS)
- Iowa City – Des Moines via the IAIS
- Des Moines – Council Bluffs via the IAIS
- Chicago – Dubuque via the Canadian National railroad

Annual costs were projected to 2040 using an annual inflation rate of 4.5%. Bringing these costs into the context of the Five-Year Program, as was done with the other modes, was not possible as passenger rail funding is not identified in the Five-Year Program. Instead, the financial analysis for the strategic plan identified annual Iowa DOT costs for development and operations and maintenance. For the purposes of the Plan, it was assumed that the Iowa DOT would be responsible for 20 percent of development costs and 50 percent of the necessary operations and maintenance subsidy. This allowed for the estimate of **average annual Iowa DOT costs** shown in [Table 6.13](#).

**Table 6.13: Passenger Rail Costs (\$ millions)**

	Average annual Iowa DOT costs
<b>TOTAL</b>	<b>\$13.419</b>

Source: Iowa DOT

### Passenger Rail Revenues

Revenues for passenger rail are also identified in the financial analysis for the strategic plan. However, these revenues are based on ridership assumptions for the various route segments, with the Iowa DOT being responsible for a share of the previously mentioned development and operations and maintenance costs. To date, revenue sources earmarked to begin addressing these costs are limited to a remaining balance of \$3 million in state passenger rail appropriations. From this figure, **average annual Iowa DOT revenues** (Table 6.14) over the life of the Plan were calculated. However, beyond this short-term commitment, the average annual Iowa DOT revenues over the life of the Plan are effectively zero.

**Table 6.14: Passenger Rail Revenues (\$ millions)**

	Average annual Iowa DOT revenues
<b>TOTAL</b>	<b>\$0.103</b>

Source: Iowa DOT

### Implications of the Shortfall

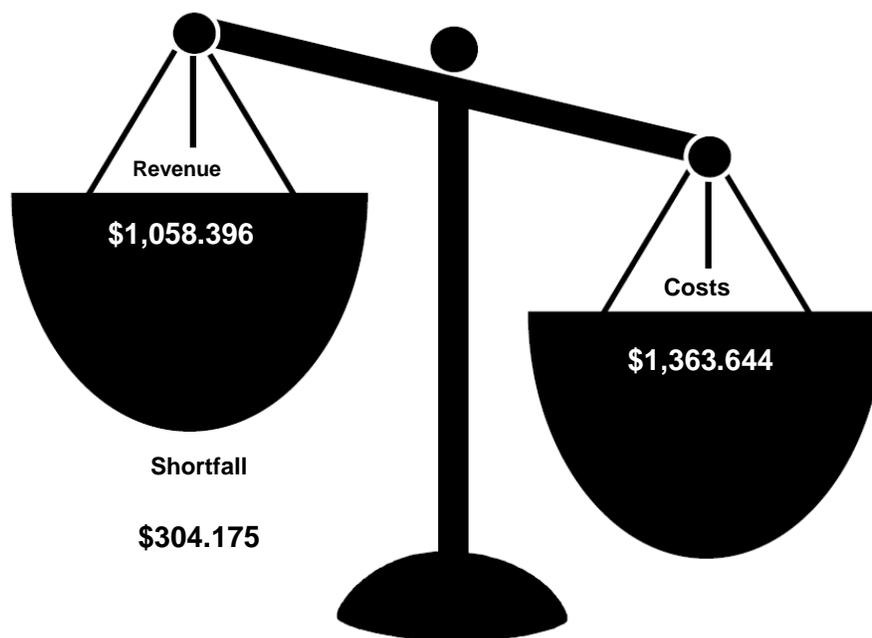
- Some highway-railroad crossings may not receive timely improvements, which could lead to potential safety hazards for railroad and roadway travel.
- Inadequate funding for spur tracks to new or expanding industries may impact future economic development and job creation opportunities.
- Some industries and communities may lose access to rail service if preservation of abandoned lines is unavailable, causing industries to close or relocate.
- Rail service may be impacted if railroads are unable to recover, without financial assistance, from natural disasters that cause infrastructure damage.
- Without adequate intermodal connections to rail, business and industry may not be able to take advantage of competitive rail rates for shipments.

- New passenger rail service may not be initiated, delaying the potential for multimodal system benefits (e.g., lower transportation costs due to alternative passenger options and improved freight infrastructure, reduced highway usage).

## 6.4 Overall funding outlook

Figure 6.12 highlights the imbalance between projected average annual costs and revenues. To fund anticipated costs across all modes, an average of \$1,363.644 million would be required on an annual basis between now and 2040. Over this same period, anticipated revenues will average \$1,059.489 million per year. This leaves an average annual shortfall of nearly \$304 million. Revenues would have to increase by 29 percent for the investment needs to be addressed.

Figure 6.12: Total Shortfall Across All Modes (\$ millions)

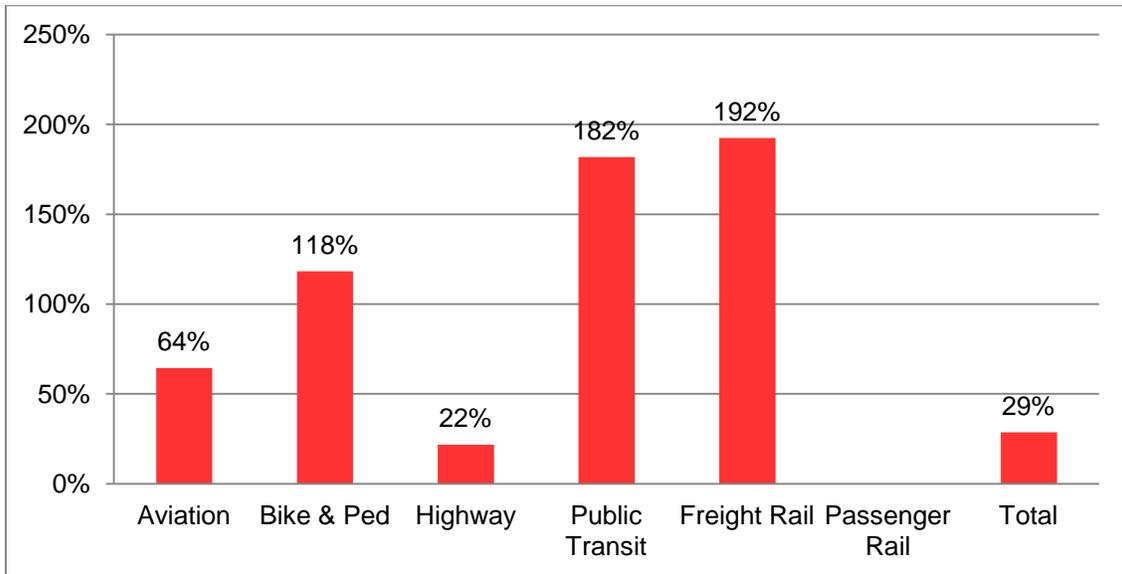


### Final assessment

The preceding pages identified the revenue shortfalls for each mode in average annual dollars and, by far, the largest shortfall in absolute dollars is tied to highways. However, examining this information from a different angle, each of the remaining modes has a greater shortfall as a percentage of revenue. This is illustrated in Figure 6.13. (Note that passenger rail has been excluded from this figure given the limited amount of committed revenue.)

Clearly, current revenues are not adequate to maintain and improve Iowa’s multimodal transportation system now and into the future. As the gap between costs and revenues continues to widen, options for addressing this shortfall must be considered. A wide variety of such options is identified in the following chapter.

**Figure 6.13: Shortfall as Percent of Revenue**



Source: Iowa DOT