PENNA TURNPIKE

LONG RANGE PLAN 2035

The Bridge to Zero Fatalities

CUSTOMER

SAFETY

FINANCIAL

INFRASTRUCTURE

MOBILITY

PARTNERSHIP

WORKFORCE

November 2016

Pennsylvania Turnpike Commission

McCORMICK TAYLOR

with

Michael Baker INTERNATIONAL GHD 4WARD PLANNING

This plan represents the Pennsylvania Turnpike Commission's (PTC) first comprehensive update to its Long Range Plan (LRP) since the original such plan – "Choices for Our Future" – was completed in 2003. The updated LRP is called "The Bridge to Zero Fatalities" and reinforces the PTC's continuing commitment to improving safety for its customers and employees. Safety is but one of several strategic drivers that motivate the PTC, yet it is a primary influence, from planning, programming, and designing capital projects, to operating and maintaining the overall system. Priorities such as safety are intrinsic to long range planning; the PTC has taken the extra step of incorporating its Strategic Plan with the LRP.

McCormick Taylor, Inc. (MT) led the update of this plan. MT documented and evaluated the PTC's current capital planning process and provided overall project management. MT was supported by Michael Baker International, which led the team's efforts on needs identification, public and stakeholder engagement, and the development of a proposed project prioritization process. Other team members included GHD Inc., and 4Ward Planning.

November 1, 2016

Dear Colleagues,

Over 75 years ago the Pennsylvania Turnpike opened as America's First Superhighway and led the way to high-speed travel and the Interstate system. Nobody had experienced anything like it. Today we continue to operate a safe, reliable, customer-valued roadway, moving more customers than ever before. In the next 20 years we want our customers to again experience nothing like our Pennsylvania Turnpike transportation system – zero fatalities, zero delay – reaffirming ourselves as America's Finest Superhighway.

This Long Range Plan 2035, "The Bridge to Zero Fatalities," serves as a roadmap to get there. As we begin plan implementation, we do so guided by three overarching principles:

1. Safety is paramount and is our cultural foundation;
2. The roadway and our fiscal position are our greatest assets and must be protected; and
3. Innovation and technology provide the opportunities to operate the organization and the roadway most effectively.

Safety is indeed the foundation of our culture at the Pennsylvania Turnpike. It is one of the first words in our mission statement, it is found in our vision statement, and it serves as the prevailing narrative for this Long Range Plan. The importance of safety cannot be understated, and it is a recurrent theme in all our plans for a reason: It must remain our chief concern.

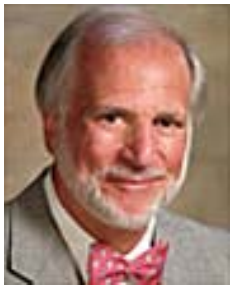
Our ongoing commitment to safety is matched by our commitment to long-range planning for our system. Our goals and strategic drivers may generally remain the same, yet the tactical steps and specific actions we need to take will no doubt need to evolve over time. Regular updates to our Long Range Plan will ensure that we are planning and programming the best projects to maintain our system with the fiscal discipline that is required.

Finally, I want to thank our commissioners for their continued guidance, and I also want to thank *you* for your passion and commitment to the commission, and for all the thoughtful suggestions you provided that helped shape the Long Range Plan 2035, The Bridge to Zero Fatalities. I look forward to beginning the task of plan implementation with your support.

Mark P. Compton
Chief Executive Officer

Commissioners

Honorable Sean Logan
Chairman



Honorable William K. Lieberman
Vice Chairman

Honorable Pasquale T. (Pat) Deon, Sr.
Secretary-Treasurer

Honorable Leslie S. Richards
State Transportation Secretary

Honorable Barry T. Drew
Commissioner

Senior Leadership

Mark P. Compton
Chief Executive Officer

Craig R. Shuey
Chief Operating Officer

Scott Fairholm
Chief Information Officer

Nikolaus Grieshaber
Chief Financial Officer

Bradley J. Heigel, P.E.
Chief Engineer

Doreen A. McCall
Chief Counsel

Ray Morrow
Chief Compliance Officer

Table of Contents

Executive Summary

Long Range Planning

TIMELINE

2003
The PTC adopts its first Long Range Plan: *Choices for our Future*.

2007
The Pennsylvania General Assembly enacts **Act 44**, a year after the Transportation Funding and Reform Commission called for $1.7 billion in new revenue annually for Pennsylvania transportation (not including the PTC).

2010
Annual PTC Act 44 payments drop to $450 million, due to the Federal decision not to approve the application to toll Interstate 80.

2013
The General Assembly passes **Act 89**, which redirects funding to public transportation and reduces the Turnpike's annual obligation over 8 years.

2014
The PTC releases its updated 5-year Strategic Plan.

2016
The PTC releases its latest Long Range Plan, which recommends a $520 million annual Capital Program with an even greater emphasis on safety.

2022
The PTC's annual Act 44 payments drop from $450 million to $50 million - a "partial sunset."

2057
The "full sunset" of Act 44 occurs - all annual Act 44 payments cease.

What is the purpose of the LRP?

The mission of the Pennsylvania Turnpike Commission (PTC) is "to operate a safe, reliable, customer-valued toll road system that supports national mobility and commerce." The 2016 update of the Pennsylvania Turnpike Commission's Long Range Plan (LRP) is centered on evaluating the condition and capital needs of the PTC's Highway, Fleet Equipment, Facilities & Energy Management Operations (FEMO), and Technology programs as they relate to our mission, and the strategic drivers contained within our amended 2014 Strategic Plan.

The LRP is also updated primarily to examine the financial realities of the day and to answer several key questions:

- What is the extent of the PTC's capital needs?
- How large should the Capital Program be?
- What should each program's share within the Capital Program be?

The update of the LRP builds upon preceding plans. The 2003 plan - *Choices for our Future* - established a broad program direction consistent with and supportive of the PTC's overall Strategic Plan. It supported fare collection enhancements, which enabled a significant increase in capital improvements. A 2007 update included a financial analysis that provided the connection between project needs and available resources.

The LRP is more of a process than a plan *per se*. It is dynamic, guiding the development of the 10-year Capital Plan, operating budget, and long range planning in general for structures, roadways, interchanges/toll plazas, and tunnels.

Updating the LRP

The PTC conducted several major tasks in updating this LRP:

■ **Collecting Data** - Information on the Turnpike's existing baseline conditions and performance was drawn from the PTC's FY15 Strategic Performance Report.

■ **Analyzing and Evaluating Capital Needs** - PTC planners coordinated with the four capital plan program managers in determining long-range needs across each of the four program areas. Current conditions and future needs (20 years) were identified for each capital element.

■ **Updating and Integrating Strategic Plan Elements** - The LRP is organized around 7 goals and 21 objectives. The goals and objectives target the initiatives that each of the PTC's departments are responsible for implementing during short-, mid-, and long-term timeframes.

■ **Analyzing and Evaluating Assets** - To ensure proper and responsible use of Turnpike funds, the PTC conducted a life cycle analysis of major capital elements to support an overall asset management and project prioritization approach to the long range planning and capital budgeting processes.

The PTC also evaluated its existing asset management information systems and the need for developing an Enterprise Asset Management System. Such a system would serve as a critical foundation to the measurement of performance and metric scorecard initiatives.

■ **Analyzing PTC's Operating Budget** - The updated LRP includes a review and analysis of the PTC's three main categories of its Operating Budget: departmental expenses, employee benefits, and Pennsylvania State Police expenses. The PTC has maintained its Operating Budget growth at a rate of approximately 4 percent over the past five years.

■ **Forecasting Revenue** - The LRP draws from forecasts from the PTC's Finance Department in determining the amount of revenue the PTC can reasonably expect to receive over the 20-year life of the LRP.

■ **Engaging the Commissioners, Stakeholders, and the Public** - The PTC facilitated a series of stakeholder coordination meetings to obtain the insights and perspectives of its partners that may have a bearing on its Capital Plan and LRP. The PTC conducted a total of 10 stakeholder meetings across the state, and also facilitated a Commissioners workshop to gain perspectives of its executive leadership.

The updated LRP - "The Bridge to Zero Fatalities" - is a significant step forward for the organization and will serve as a blueprint for capital asset investment decisions over the 10-year Capital Plan planning horizon and beyond.

Strategic Drivers

Strategic Drivers are forces that shape an organization's strategy in such a way that they determine success or failure. These seven Strategic Drivers serve as the basis for the PTC's goals and objectives, which are foundational to the PTC's various Business Plans.

SAFETY

Provide the safest possible environment for customers, employees, and business partners.

CUSTOMER

Meet and exceed customer expectations while providing safe, convenient, reliable travel.

FINANCIAL

Maintain a sound financial position.

INFRASTRUCTURE

Manage new investments and preserve the life of existing assets

MOBILITY

Achieve an accessible, reliable, and uninterrupted travel highway system.

PARTNERSHIP

Enhance stakeholder and business relationships to ensure the PTC is a valued partner.

WORKFORCE

Create a workplace environment that ensures all employees understand, respect, and encourage a commitment to the PTC's values.

Trends & Issues

Trends and issues affecting long range planning for the Turnpike are organized around seven Strategic Drivers:

SAFETY

- Distracted driving and work zone safety continue to be ongoing concerns for the PTC.

- The PTC's Traffic Engineering & Operations' (TE&O) traffic incident management (TIM) responder safety training is aiding motorists and clearing the turnpike of blockages and potential hazards. Related response metrics reports improve analysis and reporting to help prevent or reduce future incidents.

CUSTOMER SERVICE

- The public's standards for services continues to grow in an increasingly service-oriented economy. In a drive toward digital business, customers have a growing expectation to know how their toll dollars are being spent, how the PTC is addressing safety, real time access to existing roadway conditions, and travel time.

- Communication methods with customers are increasing with the use of the PTC's website, as well as new technologies such as TRIP Talk and Waze as a means of disseminating traveler information to Turnpike customers. In June 2014, the PTC established Twitter accounts, primarily to post traffic alerts.

FINANCIAL

- Revenue increased by 10.5 percent in FY16.

- At the end of FY16, the Turnpike was $11 billion in debt. This figure is expected to exceed $16 billion by FY22.

PARTNERSHIP

- "Becoming a valued business partner" is part of the Commission's overall vision. This includes public-private partnerships, and with other entities, such as PennDOT and the state's MPOs.

INFRASTRUCTURE

- Pavement Condition Ratings (PCR) and International Roughness Index (IRI) values have both been trending in a positive direction. Rutting and Skid Resistance conditions have been remaining steady.

- The PTC's rate of structurally deficient bridges has been improving.

- Service plaza conditions were rated as being in "Good" condition.

- Systemwide (Mainline/off system) deployment of ITS devices is underway.

- There is a growing need for fiber optic cable to improve the PTC's communications capacity.

MOBILITY

- Tonnage of goods moving through Pennsylvania is expected to increase by over 63 percent through 2040.

- Total vehicle miles of travel (VMT) on the turnpike increased by 6.2 percent between 2009 and 2015. Traffic volumes are just now returning to levels experienced in 2008 during the last recession.

- In 2015, the PTC's Travel Time Index was rated as "Good."

- Coming advances in connected and autonomous vehicle technology will greatly impact capacity and operations and place new demands on both operations and technology.

WORKFORCE

- The PTC faces various development and skill-building opportunities for its staff, particularly in areas related to GIS, asset management, and advanced analytics and decision support.

Existing Conditions

The condition of the PTC's existing assets has been summarized within the 2015 Condition Assessment Report, and as noted in the accompanying figure. Other trends and condition information are noted on the following page.

	GOOD		FAIR		POOR
	1	2	3	4	5
Roadway (Overall)	●				
Pavement	●				
Guide Rail			●		
Attenuators		●			
Concrete Median Barrier	●				
Drainage Infrastructure			●		
Stormwater BMPs	●				
Rock Cut Slopes	●				
Signs	●				
Pavement Markings	●				
Structures (Overall)	●				
Bridges/Culverts	●				
Sign Structures	●				
Retaining Walls/Noise Barrier	●				
High Mast Light Poles			●		
Tunnel/Portal Buildings	●				
Facilities (Overall)	●				
Service Plazas	●				
Maintenance Buildings			●		
Interchange Buildings	●				
Administrative Buildings	●				
District Fare Collection Buildings	●				
State Police Stations	●				
Stockpiles	●				
Communication Towers*					
Technology (Overall)		●			
Intelligent Transportation Systems		●			

*Insufficient inspection data to provide overall rating

The PTC's **Total Reconstruction** program began in 1999. The accompanying figure outlines the progress that has been made in reconstructing the original 470 miles of the turnpike on the Mainline and Northeast Extension.

In Miles

Reconstructed	116	19	*in Design*	123	*Total Mileage, Mainline and NE Extension*	470

∧
currently under construction

Existing Conditions (cont'd.)

INTERCHANGES

■ The PTC began a staged implementation to a cashless, nonstop travel system in January 2016 with the opening of the first highway speed cashless tolling point on the mainline at the Delaware River Bridge. Performance to-date has exceeded expectations.

■ Future targeted opportunities for conversions will involve: Beaver Valley Expressway, the northern end of the Northeast Extension, the Greensburg Bypass, and the Mon/Fayette Expressway.

■ Assuming success on the targeted conversions, the remaining PTC system will be converted to cashless-in-place. Once cashless-in-place is systemwide, the transformation to highway speed overhead tolling can begin regionally.

FACILITIES

■ The widening of the turnpike to three lanes in each direction impacts the program on many levels, from building and shed relocation, to interchange relocation.

■ Many of the PTC's maintenance sheds are at or beyond their useful life. Many are too small to accommodate today's larger truck sizes.

FLEET

■ The PTC maintains a fleet of equipment that consists of approximately 3,860 units, with an estimated value of $128.6 million.

■ The fleet consists of equipment ranging from tractors and mowers for summer operations to dump trucks for winter operations to attenuators and arrow boards for safety.

■ Safety Service Patrol vehicles are also used year round for customer safety and incident response.

■ The majority of the fleet is oriented toward winter operations.

STRUCTURES

■ Many of the PTC's 866 structures are at or nearing the end of their anticipated life.

■ The PTC's bridge conditions still compare favorably against state and national rates, by network, by deck area (see table). The PTC will continue to strive to maintain its structurally deficient (SD) bridge rating, as it is comparable to the national rate for interstates.

■ All PTC bridges currently designated as "SD" are either in design or construction for rehabilitation or replacement.

SD Bridge Rates, by deck area, %

Agency	NHS & Non-NHS	NHS	Non-NHS	Interstate
FHWA	7.1	6.0	8.7	*5.4
PTC	3.7	3.6	4.0	3.6
PennDOT	13.0	9.0	19.4	5.5

** estimated*

TECHNOLOGY

■ The PTC will soon have more devices connected to the internet than employees. The more devices the PTC has on the roadway (e.g., sensors, DMS, and cameras, etc.), the more changes will be needed in security frameworks and in improved communications infrastructure.

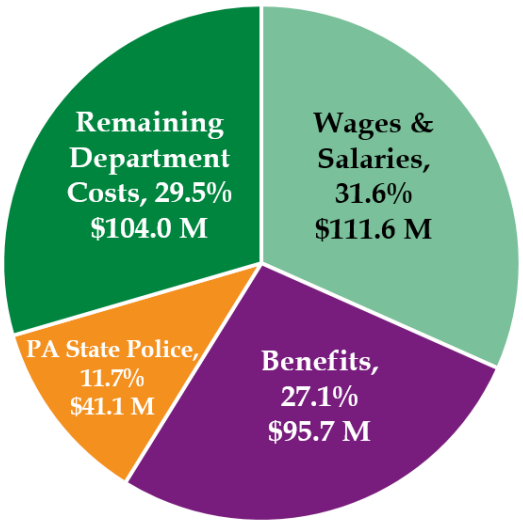
■ The PTC's communication bandwidth needs are continuing to increase.

■ Installation of fiber along the roadway will address the bandwidth needs in the foreseeable future and replace the reliance on the microwave backbone.

■ Implementing a wireless mesh overlay along the entire length of the system will support connectivity to ITS devices, public safety radio, and future connected vehicle and connected infrastructure needs.

Financial Planning

The PTC's **Operating Budget** is an estimate of the expenses needed to maintain, support, and operate the roadway and facilities for the next fiscal year. For FY15, the PTC approved an Operating Budget of $363.4 million.

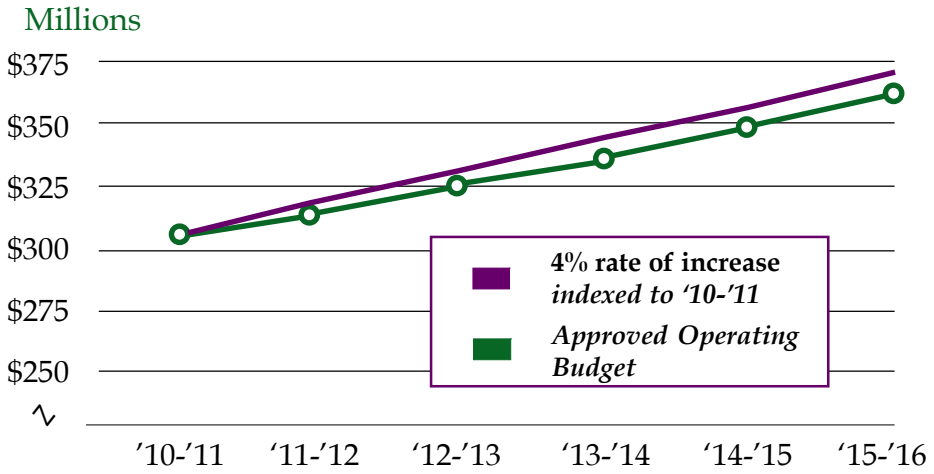


The PTC's Operating Budget is composed of three major groupings, or areas of expenditure: departmental expenses (including wages and salaries), employee benefits/expenses, and Pennsylvania State Police expenses.

Significant portions of the PTC's operating budget are influenced by external factors. These external factors include the PTC's mandated contribution to the State Employees Retirement System (SERS), the PTC's contribution amount to the Pennsylvania State Police, and increased costs associated with third-party health benefits for PTC employees.

Operating costs are expected to drop over time with the implementation of Cashless Tolling.

PTC Operating Cost Trend Against 4% Rate



The PTC has a financial planning goal of limiting the growth rate of its operating costs by 4% annually.

The PTC continues its efforts to provide recurring savings and operating efficencies that control growth of its operating costs.

Financial Planning (cont'd.)

The PTC's long-term financial picture is marked by the following:

FY15 Revenue Versus Expenditures

Turnpike annual obligations exceed operation revenue.
Revenue must go against a $600 million capital plan and operating costs, as well as debt service and Act 44 payments.

Other factors are also working against a more robust capital program...

TOTAL EXPENDITURES $1.9B		TOTAL REVENUES $2.1B	
EXPENDITURES		**REVENUES**	
Operating Expense	$350M	Total Operation Revenues	$950M
Debt Service	$430M		
Act 44 Payments	$450M		
Capital Expenditures	$640M	Bond Proceeds	$1.2B
TOTAL	**$1.9B**	**TOTAL**	**$2.1B**

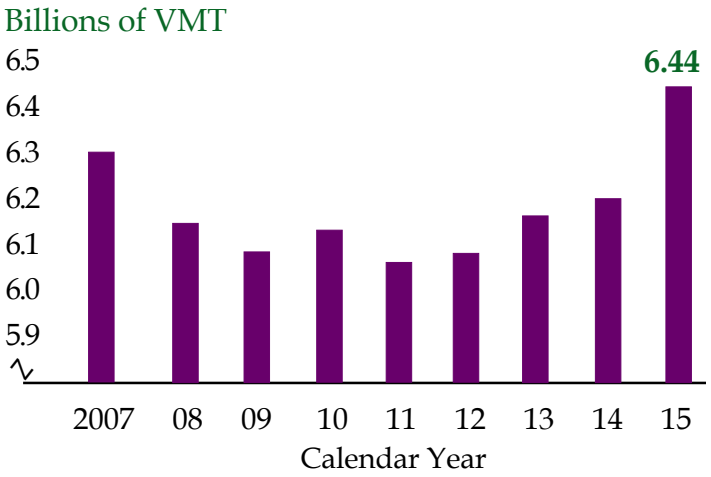
Senior Bond Ratings for the Capital Plan

All three major credit rating agencies have downgraded the PTC's bond ratings in recent years.
This increases the cost of borrowing money over time. Senior bonds are used to fund the capital plan.

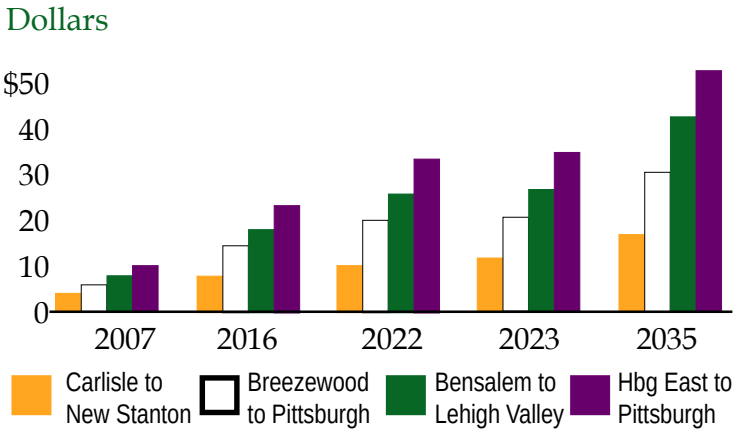
	Moody's	S&P	Fitch
1998-2007	**Aa3**	**AA-**	**AA-**
2008-2012	**Aa3**	**A+** (2008)	**A+** (2008)
2013-2016	**A1** (2013)	**A** (2015)	**A+**

Traffic and Revenue

Since the end of the Great Recession in 2009, total vehicle miles of travel on the Turnpike has increased by 6.2 percent, and today is at an all-time high of 6.4 billion, annually.



Toll increases alone will not close the gap in needed revenue...even with 6 percent annual increases. Chart shows changes in cost per trip for the four most common, long-distance trips on the system.

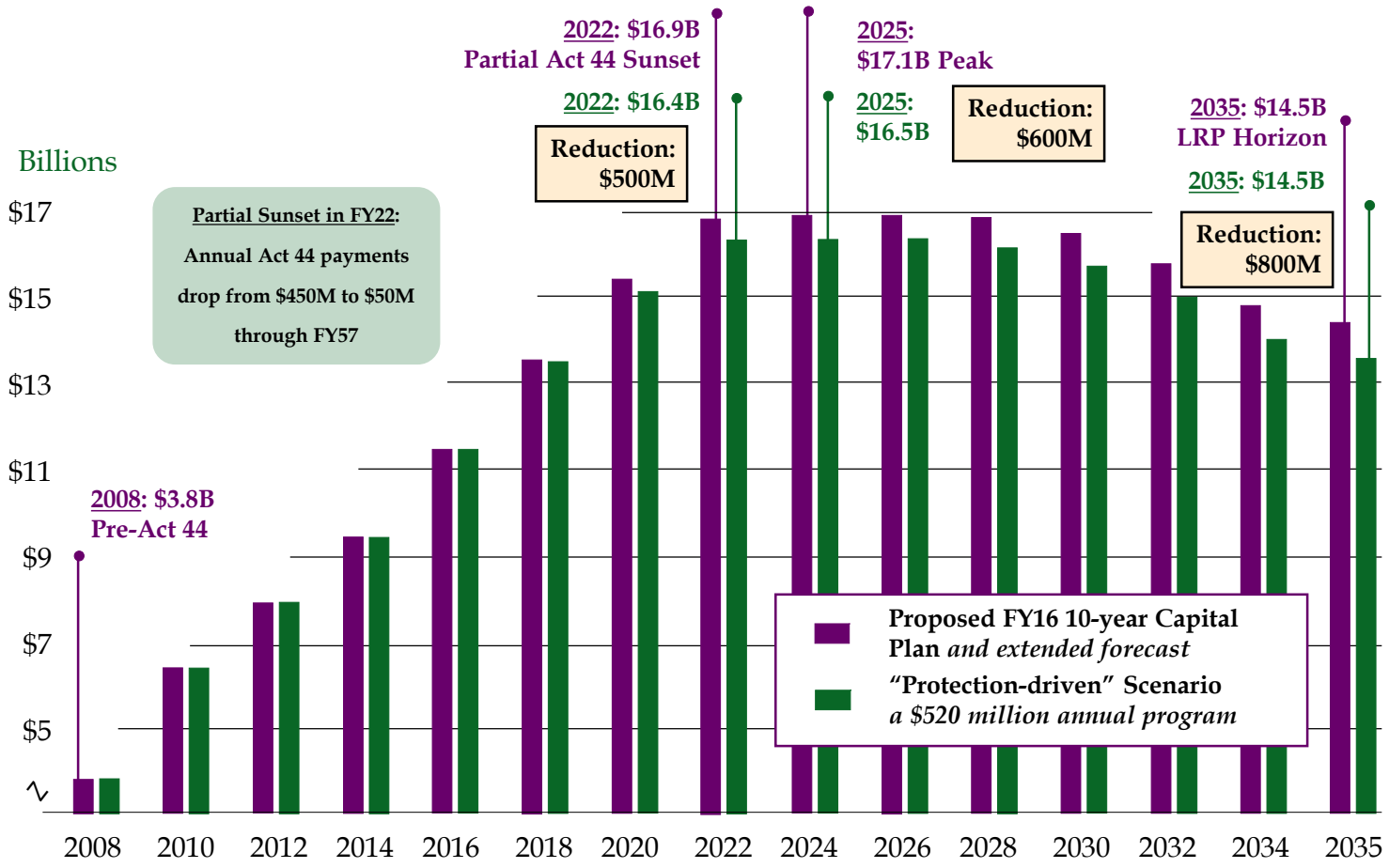


Defining a Constrained Capital Program

PTC debt is currently (May 2016) $11.4 billion, *and growing at a rate of $1 billion annually. By the partial sunset of Act 44 payments in FY22, outstanding debt is projected to be about $16 billion under the Protection-driven capital program.*

Debt Outstanding

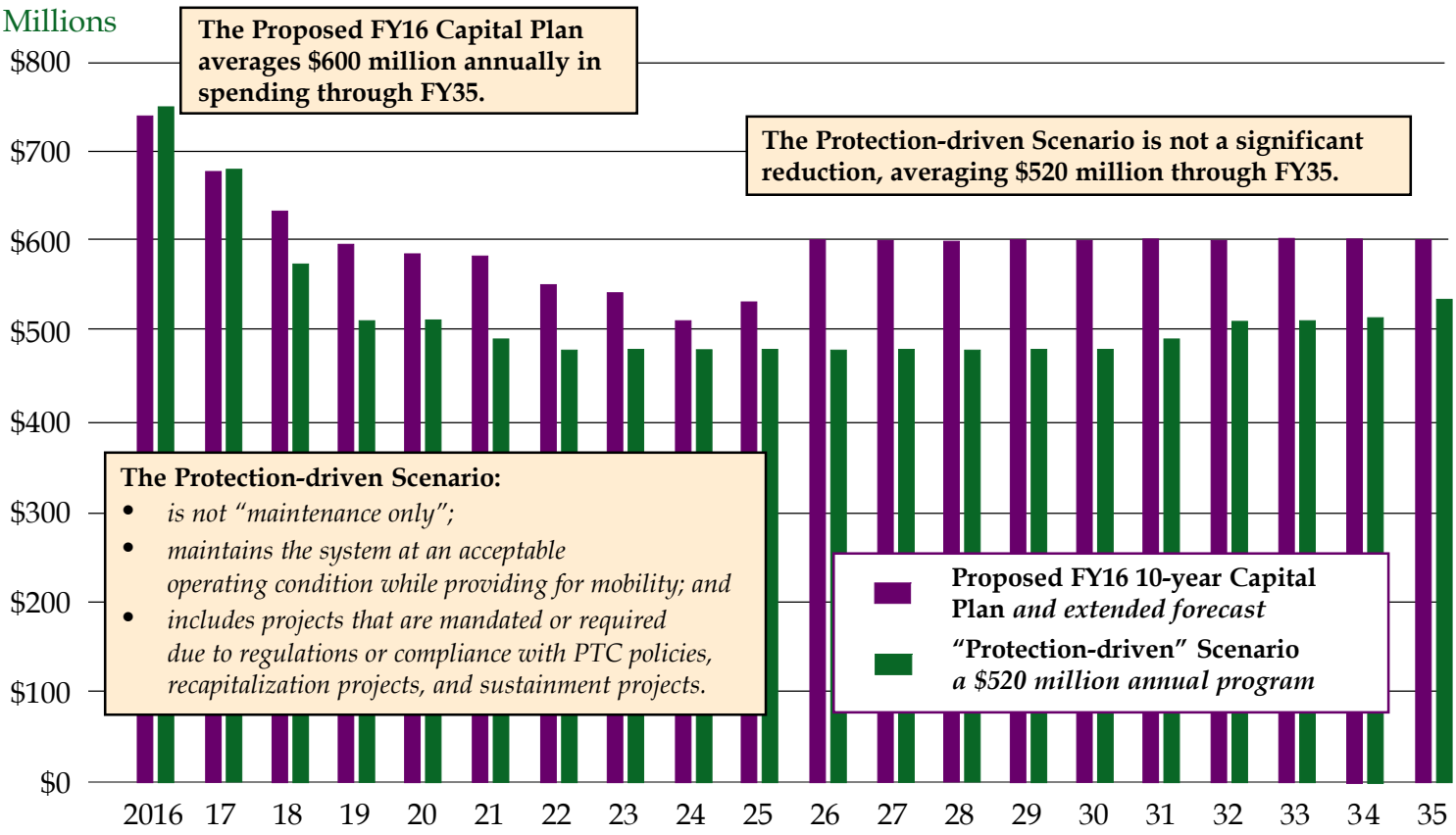
Comparing the FY16 Capital Plan (and forecast) against a Protection-driven or Constrained Scenario



The PTC must balance its debt service with the condition of the system to maintain favorable bond ratings.

Defining a Constrained Capital Plan (cont'd.)

The Protection-driven Scenario (PV)



The Bottom Line

The impacts of a Protection-driven Scenario

- Rehabilitation of the Northeast Extension and Total Reconstruction of Mid-County to Bensalem would be deferred.
- Some traffic engineering and operations projects would be delayed.
- Bridge stock would remain at 4 percent structurally deficient.
- Does not include a bypass of the Allegheny Tunnel.
- Cashless Tolling-in-Place would continue with targeted opportunities.
- Funding would remain relatively unchanged for the Turnpike's Fleet and Technology Programs.
- The $520 million Protection-driven Scenario is still funded at a higher level than the average Program over the previous decade ($500 million, present value).

A $520 million a year capital program (the Protection-driven Scenario) would yield a cumulative spending reduction of $1.56 billion (present value), or $2.1 billion (year of expenditure) over 20 years.

The Way Forward: LRP Recommendations

The Long Range Plan advances several recommendations:

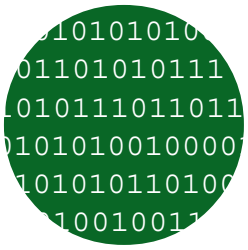
Maintain an emphasis on safety - Safety should continue as the prevailing narrative in all of the PTC's programs for their employees, customers, and work zones. This includes elevating the safety culture at the PTC, preventing injuries, and reducing workers' compensation costs, as the PTC continues its aspirational journey on the Bridge to Zero Fatalities.

Implement the Protection-driven Scenario - From the analysis performed as part of the LRP update, the PTC will need to move toward a Capital Plan of more modest dimensions. An average annual program of $520 million a year through the plan horizon year of 2035, maintaining the same program proportions, will ensure that the PTC will be able to manage its debt service while still being able to maintain its assets at an acceptable operating condition. With the adoption of the FY17 Capital Plan, the PTC has already moved in this direction to a Protection-driven program.

Refine a Project Prioritization/Evaluation Process - This Long Range Plan documents the prioritization process for the FEMO program, the Fleet program, the IT program and the categories within the Highway program. Each program has methods from which candidate projects are considered and evaluated. The refined process should define how projects are prioritized between programs, be shaped by the PTC's strategic drivers and use quantitative data where possible. The prioritization process would be created not to replace human judgment, but to serve as a planning tool that can inform PTC management of the relative merits of candidate projects before they are incorporated into short- and long-range planning and capital plans. In administering an annual program of $520 million, it is critical that the PTC ensure that it is programming only the most effective projects from the four program areas.

Implementation of plan recommendations is expected to improve safety and strengthen our financial position as we maintain our assets at an acceptable operating condition.

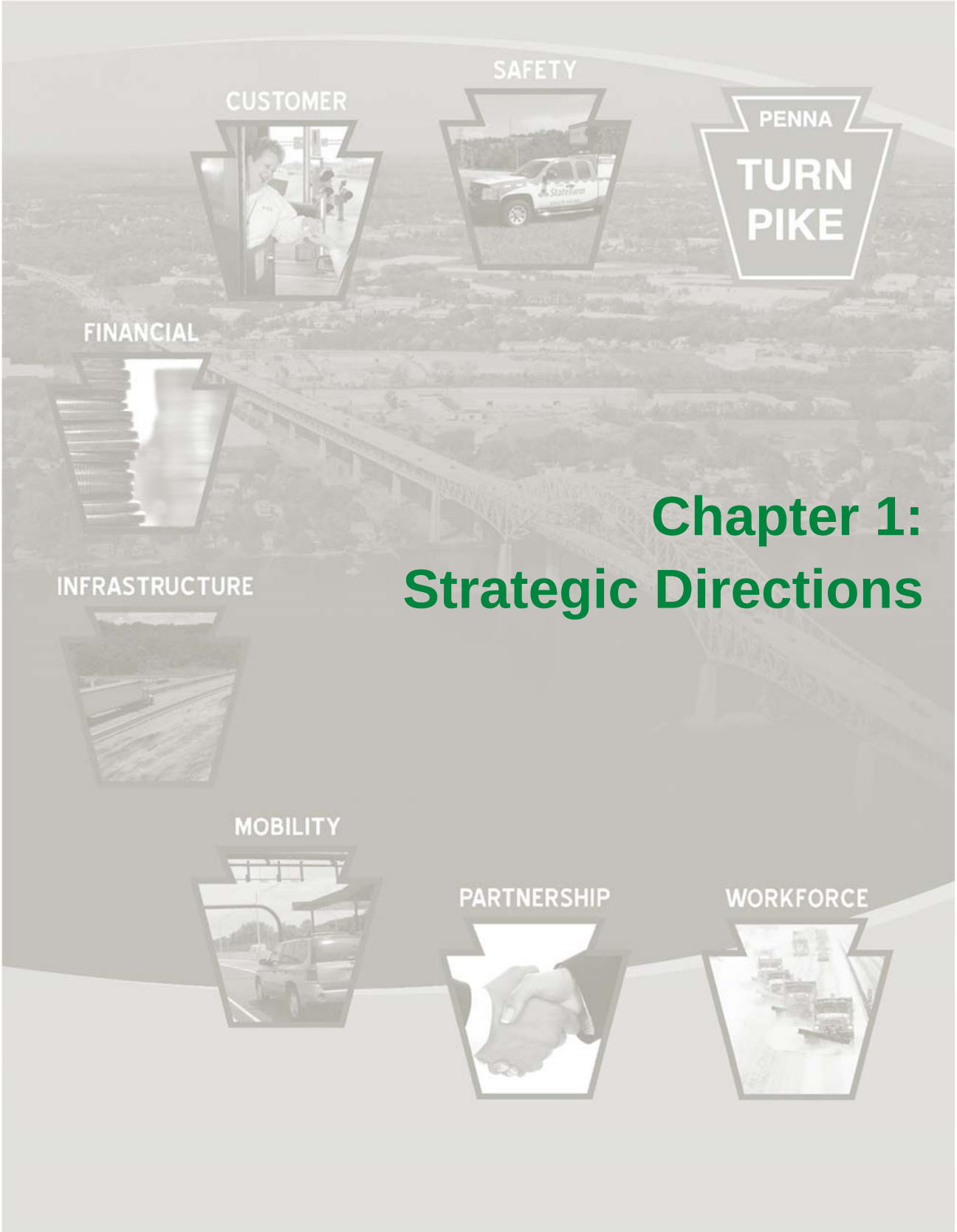
LRP Recommendations (cont'd.)



Continue the Development of an Enterprise Data Repository - This Long Range Plan developed the framework for an integrated, innovative Enterprise Asset Management System (EAMS). This new enterprise approach can improve asset utilization and performance, optimize capital cost needs, optimize asset-related operating costs, and improve the PTC's return on its capital investments. This system would also serve as a critical foundation to the PTC's performance measures and metrics scorecard initiatives. The PTC has purchased an asset management software platform and is moving forward with a sign inventory asset management system and a pavement asset management system.

Continue to Monitor Technology Advances, including Connected and Autonomous Vehicles - Advances in the development of technology is moving forward at a breathtaking pace and have the potential to impact all of the PTC's seven strategic drivers (Safety, Customer, Financial, Infrastructure, Mobility, Partnership, and Workforce). As an example, recent guidance from NHTSA and forthcoming legislation from the Pennsylvania General Assembly both point to a quickly evolving world of transportation where connected and autonomous vehicles will one day become the norm, as opposed to mere objects of speculation. As such, the PTC is making strides to adapt its roadway infrastructure for accommodating this changing technology (e.g., the P3 Fiber project). The PTC should remain abreast of ongoing developments of this technology.

Maintain a commitment to planning and performance management -
The Pennsylvania Turnpike is a dynamic organization. As the PTC evolves, it must do so with a commitment to how it plans and programs for the future. As such, the planning processes now in place give the PTC opportunities to take stock of its inventory of assets and approaches to delivering projects through its Strategic Plan, Strategic Performance Report (metrics), Long Range Plan, and Business Plans.



Chapter 1: Strategic Directions

When the Pennsylvania Turnpike opened on October 1, 1940, motorists lined up for the opportunity to travel the 160-mile four-lane highway. The general public, engineers, and transportation experts around the nation marveled at the sheer scope of the project and the seven two-lane tunnels through Pennsylvania's mountains that were the principle features of what was dubbed America's First Superhighway.

More than 1,100 engineers worked on the original stretch. When construction began, 155 construction companies and 15,000 workers from 18 states were under contract with the Turnpike Commission. During its first year of operation, daily travel peaked at 10,000 vehicles and a total of 2.7 million vehicles traveled the PA Turnpike.

The Pennsylvania Turnpike Commission (PTC) celebrated its 75th anniversary in 2015, and it is fair to say that the designers of the original system would not recognize today's Turnpike. The system has grown to 552 miles, and an average of nearly 545,000 motorists travel the Turnpike each day. In 2015, over 195 million motorists traveled on the Turnpike. The system now includes several new Turnpike expansion projects made possible by the passage of Act 61 in 1985. The Mon/ Fayette and Southern Beltway Expressway projects, the six-lane widening near Philadelphia, and the second Lehigh Tunnel are just some of the major projects made possible as a result of Act 61. In the past 20 years alone, the PTC has delivered nearly 170 miles of new highway to benefit its customers and the Commonwealth, creating new capacity, tens of thousands of jobs, and helping to bolster economic development opportunities.

The PTC continues to add capacity to meet growing demands while making record investments in its Capital Plan. In 2013, the PTC completed the 100th mile of total reconstruction as part of its ongoing, decade-long rebuilding campaign. Then on May 31, 2016, with the end of fiscal year 2016, the PTC hit historical levels of capital plan spending, finishing the fiscal year at just over $746 million in expenditures.

In addition to its rebuilding efforts, investments to improve safety for customers, employees and business partners, as well as efforts to leverage technology advances in toll collection and Intelligent Transportation Systems, have dramatically transformed the PTC.

The PTC's *role* has changed as well, and since the passage of Act 44 in 2007, it is providing funding to PennDOT to help with road, bridge, and public transportation projects across the Commonwealth. In the first six years of the Act 44 era, the PTC transferred nearly $4.1 billion to PennDOT. The payment requirements were modified as a result of Act 89 of 2013, and the PTC will continue to assist PennDOT with funding transit through 2057.[1] The PTC is working more closely with PennDOT than ever before to achieve efficiencies for Turnpike customers and all taxpayers.

The PTC's Mission Statement, Vision, and Values appear on the following page.

[1] The Act instituted a partial sunset of annual payments beginning in 2023, from $450 million a year, to $50 million.

Mission

To operate a safe, reliable, customer-valued toll road system that supports national mobility and commerce.

Vision

In serving its customers, the PTC will reaffirm itself as the world's finest superhighway by:

- Fulfilling its public responsibility to provide a safe, sustainable, uninterrupted travel experience.
- Becoming an industry leader, a valued business partner and a trusted employer.

Values

- **Communication -** Strive to foster continuous communication with employees, customers, legislators, stakeholders, and business partners.
- **Customer Service -** Maintain the highest level of quality service with a focus on safety, dependability, and mobility.
- **Diversity -** Provide equal opportunity for all employees and business partners.
- **Innovation -** Foster a visionary atmosphere to maintain a role as an industry leader.
- **Integrity -** Conduct itself transparently, responsibly, ethically, and honestly to earn the public's trust every day.
- **Professionalism -** Create a work environment where employees are empowered to take ownership of their work and provide excellence in public service.
- **Safety –** The PTC cares deeply about the safety of its employees, customers, and business partners.
- **Stewardship –** The PTC respects current and future generations by using cost-effective strategies that meet today's challenges while safeguarding resources, finances, and the environment for tomorrow.
- **Teamwork -** Promote respect and collaboration among all team members to ensure effective and efficient quality service for our customers.

Strategic Drivers, Goals, Objectives, and Performance Measures

The plan's strategic directions are discussed in the following subsection.

Strategic Drivers

Strategic Drivers are those forces that shape an organization's strategy in such a way that they determine success or failure. These seven Strategic Drivers serve as the basis for the PTC's goals and objectives, which are foundational to the Department Business Plans.

Strategic Driver	Goal
Safety	To provide the safest possible environment for customers, employees, and business partners.
Customer	Meet and exceed customer expectations while providing safe, convenient, reliable travel.
Financial	Maintain a sound financial position.
Infrastructure	Manage new investments and preserve the life of existing assets (i.e., pavement, structures, facilities, and technology).
Mobility	Achieve an accessible, reliable, and uninterrupted travel highway system.
Partnership	Enhance stakeholder and business relationships to ensure the PTC is a valued partner.
Workforce	Create a workplace environment that ensures all employees understand, respect, and encourage a commitment to the Commission's values.

Safety Goal: To provide the safest possible environment for customers, employees, and business partners.

Background: The PTC's employees recognize that their obligation is to ensure the safe travel of the approximately 545,000 motorists who rely on the PTC system each and every day, and to make colleagues and countless business partners, including first responders, safe while working anywhere and at anytime on the system.

Objectives	Measures
1.1 Reduce the number and severity of crashes.	• Number of fatal crashes/100 Million Vehicle Miles Traveled (MVMT) (3-year average) • Reportable crashes/Million Vehicle Miles Traveled (3-year average)
1.2 Reduce the number and severity of crashes in work zones.	• Work zone related crashes/construction dollars spent (3-year average)
1.3 Reduce the number and severity of "on-the-job" injuries to employees.	• Lost time/employee hour for PA Turnpike employees • Number of employee lost time injuries • Number of employee equipment accidents • Workers' Compensation payments

Customer Goal: Meet and exceed customer expectations while providing safe, convenient, reliable travel.

Background: The PTC's employees recognize that customers expect a high level of service for their toll dollars and the PTC delivers that high level in every facet of its operations. Customers value the PTC's 24/7 maintenance presence on the road, the commitment to ensure a free flow of traffic no matter the weather, and quick and timely response to their inquiries. The PTC understands that "customers" are not limited to the approximately 545,000 motorists who use the system daily. The PTC's business partners and stakeholders, including local businesses and economic development entities across the system, from engineering and maintenance to legal and financial, value the PTC's professional level of service and deep expertise in all critical areas of its operations.

Objective	Measure
2.1 Improve customers' experience.	• Customer service index from annual customer satisfaction survey • Number of CAC and CSC/VPC inquiries received and the ticket timeframe for closure • Results from the annual customer satisfaction survey on perceived value of toll dollars

Financial Goal: Maintain a sound financial position.

Background: The PTC's staff of financial professionals is deeply committed to managing its customers' toll dollars and the Commission's overall financial position so that it continues to provide a safe and valued travel experience every day while making wise and needed investments in the system's infrastructure. The PTC recognizes that the national and global economies, as well as local and state level policy decisions, can have a direct impact on its financial position and it has a responsibility to either help guide or respond accordingly to these external forces.

Objectives	Measures
3.1 Maintain and provide support to the PTC's credit rating.	• Bond rating • Debt services coverage ratio
3.2 Improve operational efficiencies.	• Percentage of growth in the operating budget • Overall variance between approved operating budget and the year-end budget spending
3.3 Maintain or increase toll revenue amount.	• Toll revenue amount • Capture rate = Net Toll Captured (Net Toll Revenue + Fee Revenue - Bad Debt and Revenue Adjustments) and Percent of Net Tolls Captured (Net Tolls + Fees - Bad Debt and Revenue Adjustments/Net Tolls + Fee Revenue) • Non-toll revenue amount
3.4 Promote and analyze the Turnpike's ability to implement innovations.	• Number of innovations and innovative practices evaluated by the Innovation Council, AIM, or other PA Turnpike committee

Infrastructure Goal: Manage new investments and preserve the life of existing assets (i.e., pavement, structures, facilities, and technology).

Background: The Turnpike is a 552-mile system that is an integral component of the state and national ground transportation network that must be protected and constantly improved for the present generation and generations to come. PTC customers expect a safe travel experience and in order to ensure their satisfaction, the PTC must make smart investments in all of its systems. Its responsibility to be good stewards of this system extends beyond the lane miles and includes responsible maintenance of all of its facilities and the technology that it uses to manage all of its assets.

Objectives	Measures
4.1 Maintain and improve assets in a “good” state of repair while using a life cycle approach.	• Percentage of structurally deficient bridges by number and deck area • Overall average Pavement Condition Rating (PCR) of 80 or better and a minimum PCR of 65 for any roadway section • Overall average IRI between 71 and 100 with a maximum of 150 for any section • Number of elements from the latest tunnel inspection with a condition rating of 3 (poor) or 4 (severe) • Implementation of Asset Management Systems • Implementation of Facility Condition Index (FCI) and continued improvement of assessment scores • Percentage of system availability
4.2 Manage the delivery of the Capital Plan.	• Overall variance between the approved Capital Plan and the year-end Capital Plan spending
4.3 Manage resource consumption.	• Annual energy consumption
4.4 Aid in preserving the quality of pavement and structures by developing and delivering an Annual Work Plan.	• Percent complete of Annual Work Plan

Mobility Goal: Achieve an accessible, reliable, and uninterrupted travel highway system.

Background: The PTC's employees recognize that as toll collection technology continues to evolve, its customers increasingly demand safer, more efficient, and more convenient travel on the system. Since the introduction of E-ZPass in 2000, PTC customers continue to enroll in increasing numbers and the PTC has worked to manage this transformation for customers and its workforce. The PTC has also maintained a high level of attention to its customers who continue to pay their tolls in cash. While the Commission continues to accept cash payments for tolls, customers will not see any reduction in the level of service they currently enjoy. The Commission's hybrid cash and E-ZPass system poses long-term challenges for customers and the organization that can only be addressed through the implementation of cutting edge technology that is transforming the industry.

Objectives	Measures
5.1 Achieve an efficient toll collection system through the increased use of E-ZPass and expanded use of toll collection alternatives.	• On-schedule implementation of a cashless tolling pilot program at the Delaware River Bridge and Beaver Valley Expressway • Percentage of transactions that are E-ZPass • Percentage of revenue that is E-ZPass • Percentage of transactions that are Toll by Plate • Percentage of revenue that is Toll by Plate • Capture rate of Toll by Plate
5.2 Increase mobility and reliability in travel time.	• Travel Time Index • Planning Time Index • Clearance time by incident type • Wasted time per customer by vehicle type • Percent of congested travel
5.3 Implementation and incorporation of a Reconstruction Long Life Strategy.	• Complete plans and implement systems

Partnership Goal: Enhance stakeholder and business relationships to ensure the PTC is a valued partner.

Background: The PTC's governmental stakeholders include public officials, agencies, regulators, and policymakers at the local, state, and national levels of government. The PTC also works closely with municipal, county, and regional officials throughout the state ensuring coordination of design and construction projects as well as timely communication of Commission activities to its customers and business partners. Since Act 44 in 2007, the PTC's role as a statewide transportation entity has evolved significantly, and the PTC team continues to adapt and work closely with its stakeholders and customers.

Act 89 of 2013, a landmark transportation funding law, has positioned the Commission to pursue a strong, yet independent, working relationship with PennDOT to partner on initiatives that will provide operational efficiency, modernization, and innovation to both agencies.

The PTC further understands the challenges and opportunities that its Total Reconstruction initiative poses to local elected officials and local leaders across the system. The PTC recognizes the need to forge positive, collaborative partnerships with governmental stakeholders as an important requirement in achieving its vision to reaffirm itself as a worldwide leader in the provision of transportation services.

Objectives	Measures
6.1 Advocate for favorable legislative and regulatory initiatives.	• Quarterly review and evaluation of key legislative initiatives
6.2 Forge positive and collaborative relationships through outreach and education programs and timely responses to inquiries.	• Number of outreach and education programs initiated and participated in with the PTC's partners • Response time to inquiries and reporting outcomes by partner type

Workforce Goal: To create a workplace environment that ensures all employees understand, respect, and encourage a commitment to the Commission's values.

Background: The success of this LRP and the long-term viability of the Pennsylvania Turnpike Commission will be determined by its dedicated team of professionals who remain committed to meeting customers' needs at all times, in every decision that is made, and action that is taken.

Objectives	Measures
7.1 Improve the PTC's compliance and transparency efforts.	• Percentage of accepted audit recommendations implemented; • Percentage of accepted Advisory Committee recommendations implemented
7.2 Meet or exceed the specified Diverse Business commitment for individual contracts: construction, engineering professional services, and job order.	• Construction Contracts: On a contract by contract basis, the total amount paid to Diverse Businesses versus the total amount paid on the respective prime contract, compared to the final Diverse Business commitment for the respective prime contract • Engineering Professional Services: On a contract by contract basis, the total amount paid to Diverse Businesses versus the total amount paid on the respective prime contract, compared to the 10% MPL goal • Job Order Contracts: On a contract by contract basis, the amount paid to Diverse Businesses versus the total amount paid on the respective prime contract, compared to the 10% MPL goal
7.3 Employ a workforce whose demographics reflect the demographics of the Counties/Regions the Turnpike traverses, transportation industry standards, and Commonwealth agencies.	• Comparison of the Turnpike employment demographics versus the demographics listed in the objective
7.4 A strategically planned, engaged, and prepared workforce.	• Enhance training and development curriculum Commission-wide (number of department trainings reviewed, updated, eliminated, and added); • Voluntary and Involuntary Turnover rate and cost (Commission-wide and by Department)

The Approach Moving Forward

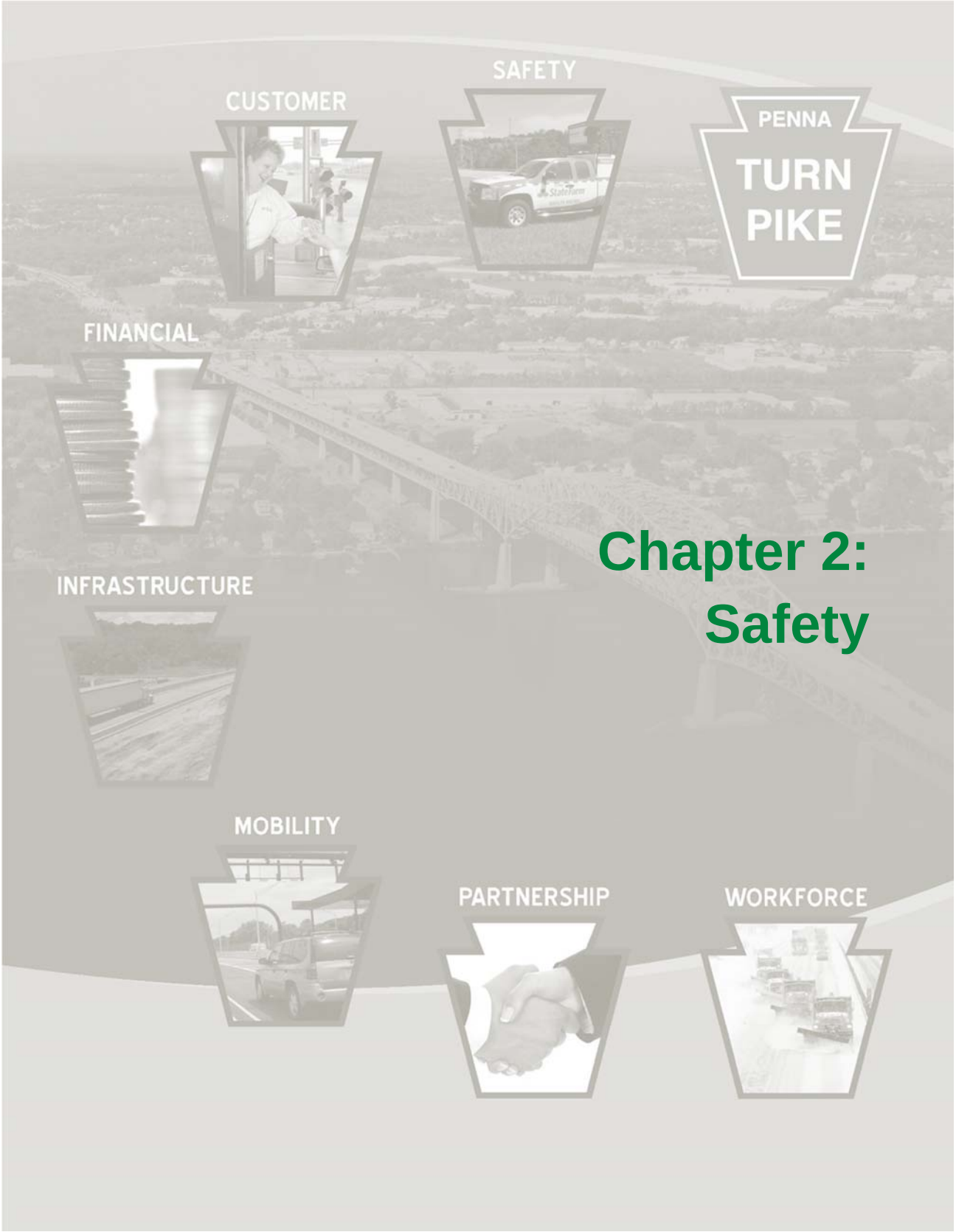
The PTC's Executive Management Team (EMT) is excited to work together to help re-establish the PTC as a world leader in the industry. The process begins with increased communication within the PTC from one Department to the next. Doing more as an organization to empower talented colleagues to become more active in the decision-making process will ensure great strides in the PTC's drive toward increased safety, improved mobility, and better management of its assets and operations. The PTC has a tremendous pool of professionals committed to working together to address the opportunities and challenges.

The seven strategic drivers establish the PTC's overall goals and objectives to achieve over the next five years. These objectives were assigned to an owner and it is now up to them and their respective Department staff to develop specific steps, also known as tactical initiatives, to achieve those goals and objectives. The goals and objectives form the basis for Department Business Plans. The Business Plans convey how each Department will contribute to achieving the overall PTC's goals and objectives and serve as a road map to chart the direction over the next year. The Business Plans are tied to the PA Turnpike's annual budget and will serve as a "scorecard" throughout the year. The Business Plans will be re-visited regularly to update and revise as necessary. The fiscal year-end results from the Business Plans will also be a tool that will be used as a part of employee evaluations.

The "dashboard," containing all of the goals and objectives to be achieved by each Department and will provide information on progress toward the established target for the objectives. Progress will also be measured on each Department's tactical initiatives needed to achieve the objective.

This LRP and its associated strategic drivers represent a significant step forward for the PTC. It is a tool that provides a foundation for how the PTC conducts its operations every day and serves as a blueprint as it moves forward to address a rapidly changing transportation landscape.

The LRP will be updated again in 2020 and in 5-year cycles thereafter. It is all part of a continuous effort and process to ensure the currency of our plans, and that they reflect the latest data and information available to guide our planning and programming activities.



Chapter 2: Safety

The issue of safety is part of the prevailing narrative found throughout this LRP. Safety is one of the PTC's strategic drivers, and is also strongly reflected in the theme of this LRP: "The Bridge to Zero Fatalities."

In response to its Mission Statement to "operate a safe and reliable and efficient toll road system," the PTC closely monitors the safety performance metrics of its employees and customers by routinely reviewing its Safety Dashboard. This visual instrument provides a "one-stop shop" for obtaining safety data related to employees (employee injuries and equipment accidents) and customers (total crashes and fatalities, and work zone crashes). A screenshot of the Safety Dashboard is shown in **Figure 1** for illustrative purposes.

Figure 1: PTC Safety Dashboard Screenshot

Source: PTC

Employee Safety

Safeguarding the PTC's most valuable asset, its employees, is paramount and the following areas of emphasis address safety essentials: Safety Program Assessment and Improvement Initiative, and Workplace and Employee Safety Program.

The Safety Program Assessment and Improvement Initiative

While all of the efforts discussed are aimed at making the roadway safer for motorists and employees, efforts are also in process to elevate the safety culture within the PTC. As a part of its ongoing safety and health improvement efforts, the PTC retained a firm to assist it in conducting a Safety Program Assessment and Improvement Initiative. The purpose of the initiative was to identify actions that can be undertaken by the PTC to improve safety policies, procedures, training and culture, with the end result of preventing employee injuries and reducing associated workers' compensation (WC) costs.

The assessment included a review of injury trends by department, district, and type, along with a review of safety program management processes to highlight the areas that warrant additional attention as a part of a multi-year safety program improvement plan.

The primary focus of the Safety Program Assessment was to review procedures and training programs in place, both at the Central Administration Building (CAB) and selected worksites, that are designed to reduce the most frequent and costly injuries. This assessment was heavily focused on the activities and work practices performed by Maintenance and Fare Collection. Facilities and Energy Management Operations (FEMO) and Engineering were also included in the assessment due to the significant potential safety exposures associated with these operations, including work around live electrical equipment, work at heights, and work in live traffic.

The Employee Safety Committee (an executive level steering committee) consisting of the Chief Operating Officer, the Employee and Customer Safety Unit of Traffic Engineering & Operations, and the Compliance Department are overseeing implementation of the Safety Program Assessment recommendations in addition to the Work Place and Safety Employee Program.

Work Place and Employee Safety Program

Work Place and Employee Safety Program was founded on fostering safety and health procedure training and on the identification and correction of unsafe workplace conditions. Working in tandem with Risk Management, the Safety Unit assess safety incident data for condition and injury trends and develops and executes appropriate training. Trainings are either mandatory qualifications for the job position or as elective and implemented in several approaches: class room-style at a designated location, at Safety Training Day at a PTC location, or e-learning by means of the PTC University.

The Employee and Customer Safety Unit endorse safe work practices for all employees. In conjunction with Risk Management and Compliance, the Safety Unit designed Event Progression sequences for Injury-(Non) Emergency, Unsafe Condition, and Safety Observed Conditions events. These guides in flow-chart format, illustrate the course of action to follow

from start to conclusion for the various event types. By adhering to the event progression sequences, the PTC can continue to work to prevent unsafe acts and conditions with the intent to reduce the occurrence of work related accidents, employee injuries, and other property losses.

The Employee Recognition Program was launched June 1, 2016. The design of the program provides for employee buy-in with the support in the reduction of injuries and associated costs. The recognition element brings safety awareness to the forefront by awarding locations that work injury free for a specified period of time. The injury free progress will be tracked on Highway to Safety posters and commemorative "ZERO Injury" coins will be issued to locations lacking injuries of the Maintenance, Fare Collection, FEMO, and Construction field locations.

Roadway Safety

When comparing the PA Turnpike with other interstate highways in Pennsylvania, for the three-year period ending 2014 (the most recent years with available data), the PTC's three-year average fatality rate was approximately one half of the Pennsylvania interstate rate. Similarly, in Maryland, the interstate highway system had an average rate that was 33 percent higher when compared to the PTC's 3-year average fatality rate. However, toll roads are typically operated centrally on a 24-hour basis from modern operations centers linked to dedicated maintenance, emergency response, and police personnel. Historically, the PTC has had a lower fatality rate than the regional interstate system and is consistent with or less than adjoining tolling agencies such as those in Ohio and New Jersey.

Table 1 depicts the 3-year average fatality rates of the PA Turnpike against other adjacent interstate and toll agency systems.

Table 1: Fatality Rate Comparison, PTC and Peer Systems, Calendar Year 2012-14

Agency/Entity	Rate (Fatalities per 100-MVMT)	Difference*
Pennsylvania Turnpike Commission	0.28	--
Pennsylvania Interstate System	0.56	(50%)
Maryland Interstate System	0.42	(33%)
Ohio Turnpike and Infrastructure Commission	0.28	0%
New Jersey Turnpike Authority	0.40	(30%)

**percentage difference when compared to the Pennsylvania Turnpike Commission rate*

Since 2011, the PTC has had fewer than 20 fatalities, system-wide, during any calendar year and is averaging approximately 18 fatalities per year. In 2015, there were 17 fatalities system-

wide, which is slightly less than the number of average fatalities over the previous 5-year time period. **Table 2** lists the total number of fatalities system-wide for the 5-year period ending 2015.

Table 2: Fatality Rate Comparison, PTC and Peer Systems, Calendar Years 2012-15

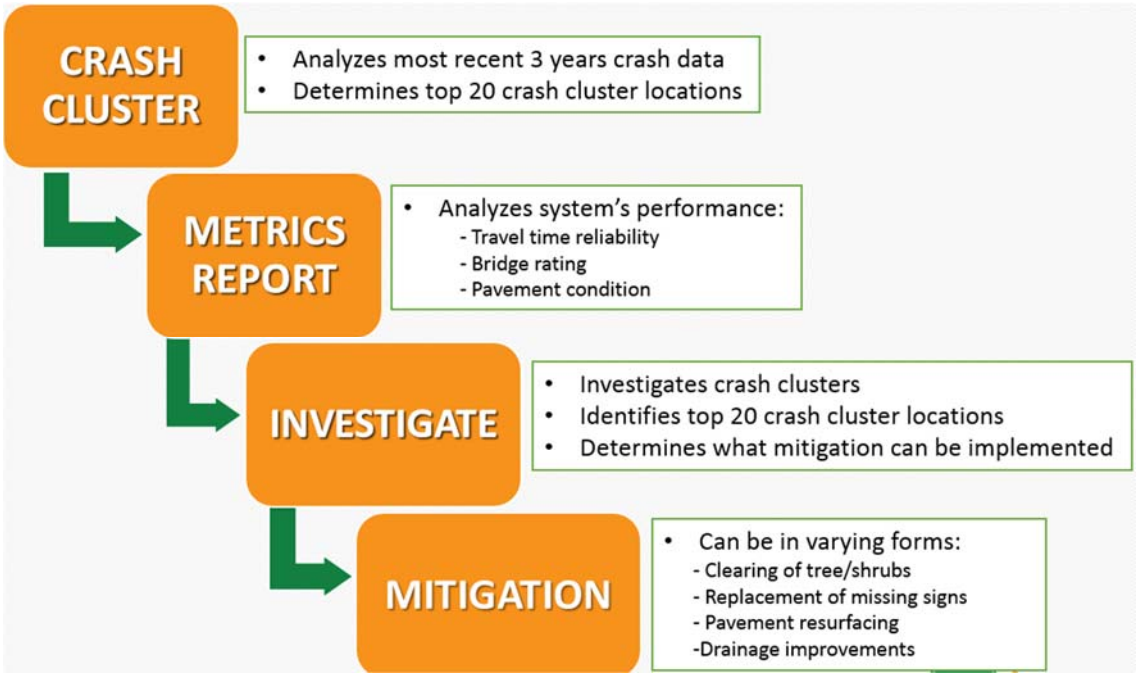
Calendar Year	Vehicle Miles Traveled (Billions)	Total Fatalities	Fatality Rate (per 100-MVMT)
2011	6.04	19	0.31
2012	6.06	17	0.28
2013	6.17	18	0.29
2014	6.22	17	0.27
2015	6.45	17	0.26

In order to provide the safest possible environment for customers, employees and business partners, the PTC must ensure that customers experience accessible, reliable and uninterrupted travel along the system.

There are many efforts underway to achieve these objectives.

The primary tool used for monitoring and continuously improving safety is the Roadway Safety Management Process. This process involves multiple departments within the PTC and incorporates data collection, analysis, processing, assessment, implementation/mitigation and monitoring. The process is as shown in **Figure 2**.

Figure 2: Roadway Safety Management Process Flow Chart

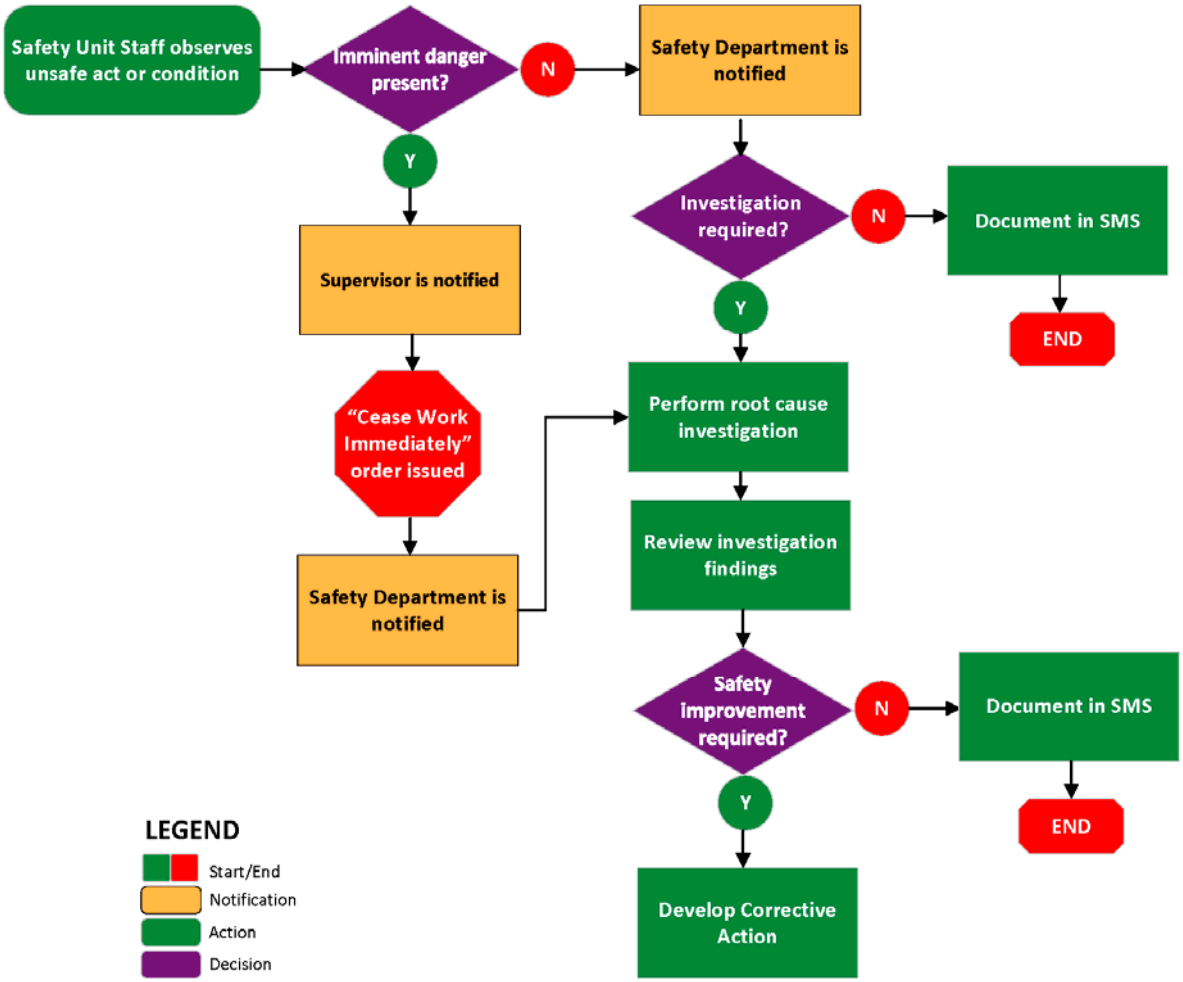


Although the process is on-going, a starting point is identified with the annual system performance review. Section 705 of the Trust Indenture states that the PA Turnpike System shall be inspected a minimum of every three years and that a report shall be filed with the Trustee as to the condition of the System.[2] With the agreement that was executed in 2001, the responsibility for this report was assigned to the General Consulting Engineer. The focus for this condition assessment centered on four key asset groups of the System: Roadway, Structures, Facilities, and Technology. The condition of these assets directly relates to the safe operation of the system. For example, a smooth roadway riding surface, proper roadway drainage, sound load carrying bridges and Intelligent Transportation Systems (ITS) devices all contribute to the safe and efficient travel for motorists along the turnpike. The information and data collected from the condition assessment is used for measurement purposes during the development of the annual performance metrics report.

While the condition assessment documents the quality of the roadway, structures, facilities, and technology, it does not depict the trends in such safety related measures as: crash frequency, crash severity, incident duration, incident clearance time, travel time index and levels of service. Annually, the PTC conducts a review of the most recent five years of crash data to determine if there are areas where crashes happen more frequently. This is shown as the Crash Cluster Reporting Process in **Figure 3**.

[2] References to the Trust Indenture refer to the Amended Trust and Restated Trust Indenture of March 1, 2001.

Figure 3: Crash Cluster Reporting Process

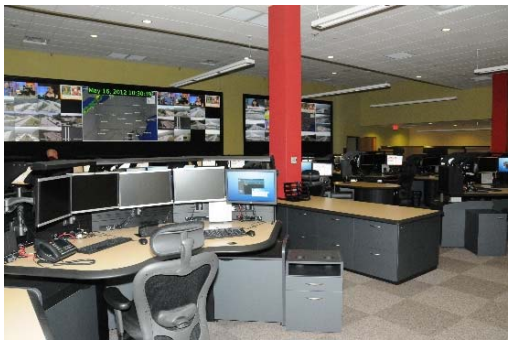


The findings from this investigation are then shared with various departments, such as Engineering Design & Construction, Traffic Engineering & Operations, and Maintenance with the intention of determining possible mitigating measures for the high crash locations. Mitigation can range from measures such as replacement of delineation, tree trimming or milling and repaving certain sections of the roadway. Depending on the extent of the mitigation, it may an expensive project that requires insertion in the Capital Plan for funding.

The PTC has completed, is in the process, or has future plans for reconstructing sections of the mainline. Any construction or maintenance activity related to the roadway requires the use of work zones. Work zones introduce changes to the normal physical roadway environment which, if not done properly, can confuse motorists. For example, work zones can contain transition areas, reduced lane widths, large trucks entering and exiting the highway, temporary pavement markings; all things that can impact motorist safety. As the number and duration of construction zones increased, significant effort has been focused on work zone safety. At a baseline effort, the PTC's staff routinely run statistics on work zone crashes, conduct analyses

of crashes, and develop initiatives to improve customer and worker safety and reduce the number and severity of work zone crashes.

Another effort to improve safety is the trial and analysis of various types of pavement markings along the system. Pavement markings provide positive guidance to motorists during all hours of the day, and are specifically helpful at nighttime when vehicle headlights illuminate the roadway. Currently, the PTC deploys standard waterborne/latex pavement markings throughout the system for all of its longitudinal lines. Waterborne/latex pavement markings can degrade significantly over a short period of time. Due to high traffic volumes and winter maintenance activities, the PTC deploys waterborne/latex pavement markings twice a year (spring and fall) to maintain proposed federal minimum retro-reflectivity standards. The PTC is testing pavement markings such as polyurea, tape and epoxy pavement markings. The implementation of these pavement markings is being done as a three-year pilot program, whereby the retroreflectivity of the markings is measured twice per year to determine if they are maintaining certain minimum levels of reflectivity.



The PTC's **Traffic Operations Center** oversees the safety of the roadway system by monitoring it 24 hours per day and 7 days per week for any problems that may arise. If an incident is identified on the roadway by customers, safety service patrols, closed circuit cameras or Pennsylvania State Police (PSP) necessary resources are immediately dispatched to respond and quickly clear the incident. Timely clearing of incidents from the system ensures minimum disruption to motorists and decreases the chances for secondary crashes to occur. The incident timeline is logged in the Computer Aided Dispatch (CAD) system by radio dispatchers at the Traffic Operations Center. Data from the CAD system is compiled as part of the metrics report to determine the average time is takes to clear an incident. This measure is an accurate way to determine whether or not mitigating measures implemented across the system are effective. For example, recently the PTC entered into an agreement with the traffic monitoring and reporting company Waze to improve situational awareness and decrease incident duration times.

In the event that a major incident occurs that results in significant disruption to motorist mobility, an After Action Review (AAR) is performed. The intent of the AAR is to review the events leading up to an incident, the details of the incident itself, and the measures deployed to rectify the situation. Once these items are documented, the PTC composes a list of potential improvements for potential implementation. An example from a recent AAR was to provide Traffic Incident Management (TIM) training to all PTC Maintenance personnel, Authorized Service Providers (ASP), PSP Troop T, and all emergency responders across the system. TIM

training improves the safety for all responders and decreases incident clearance times which in turns benefits the motorists.

Work Zone Safety

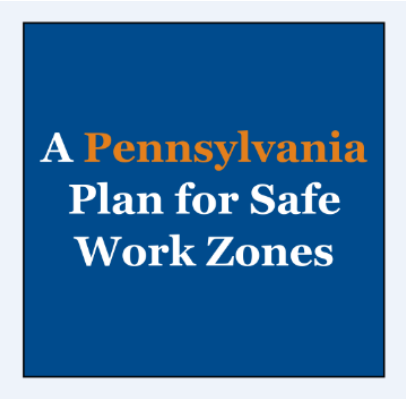
One of the major initiatives to decrease work zone crashes was the development and implementation of Operation Orange Squeeze and Orange Improvement Zones. Operation Orange Squeeze is a speed reduction tactic whereby troopers monitor speeds in work zones in an uncommon manner. Troopers will be in orange, Turnpike construction vehicles running radar in work zones with another trooper waiting outside the work zones ready to pull over and cite offenders. The thinking is that motorists will not know where or when troopers will be in construction vehicles, so they need to always obey the posted speed limit and travel with headlights turned on in all active work zones. The State Police will have zero tolerance for unsafe and aggressive driving in work zones. The safety of workers and motorists is of the utmost importance. The Orange Improvement Zone is a campaign to provide updates, short-term traffic impacts, and safety tips while explaining the long-term benefits of construction improvements. The Orange Improvement Zone deploys a variety of tools to share information — including social media like Facebook, Twitter and Instagram — about what is going on in the construction zone. The goal is to offer regular, real-time updates on the improvement project and help travelers and neighbors recognize the reason for construction and its benefits.

To further advance work zone safety initiatives, the PTC established the Work Zone Safety Subcommittee (WZ Safety Subcommittee) in December 2014 as an extension of the Incident Management Committee, which focuses on improving safety within and approaching work zones. The objective of the WZ Safety Subcommittee is to identify areas for improvement and recommend solutions in an effort to reduce the frequency and severity of work zone crashes. The Subcommittee meets monthly to conduct reviews of crashes that occur within a work zone to determine trends, patterns and areas for improvement and submits quarterly reports to the Commissioners. In addition, the Subcommittee is advancing an evaluation of work zone speed enforcement strategies for potential implementation.

The Work Zone Safety Subcommittee contains members from various departments, such as: Engineering Design & Construction, Maintenance, Traffic Engineering & Operations, PSP Troop T, and Public Relations and Marketing. One example of the success of this subcommittee is the identification of a crash pattern in the eastern portion of the state with truck and trailer mounted impact attenuators. The Public Relations and Marketing Department developed news and media advertising and specifically broadcast these commercials in the eastern portion of the state.

There was a documented decrease in the type and number of these types of crashes during the targeted advertising period. The WZ Safety Subcommittee also evaluates technology, equipment, materials, enforcement, and educational opportunities at both the state and national levels that can improve customer and worker safety and foster a comprehensive management approach through evaluation and reporting of performance.

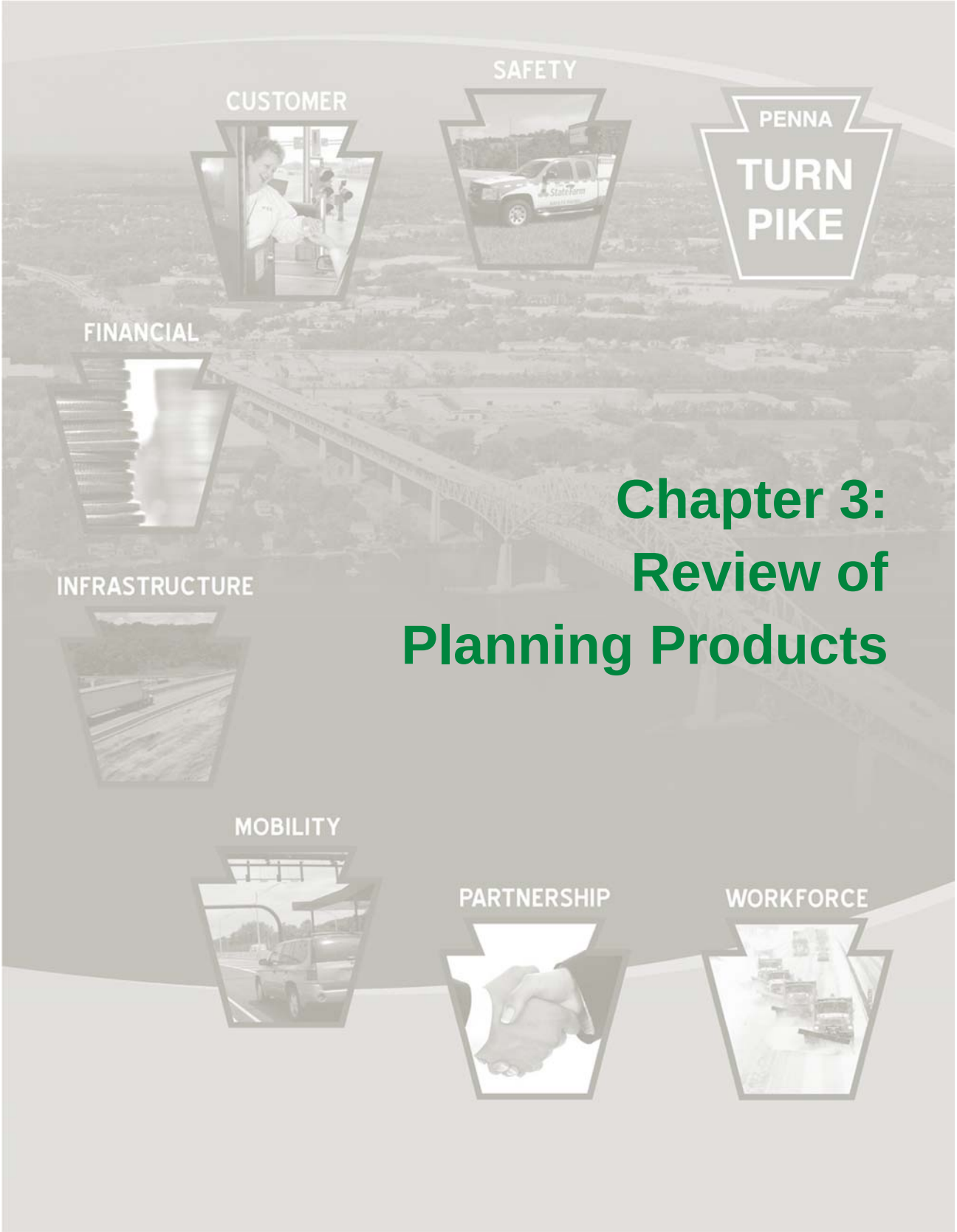
Furthermore, the PTC and PennDOT held a Work Zone Safety Summit in November 2015 to collaborate on issues and concerns throughout Pennsylvania. This summit resulted in the development of strategic initiatives for further implementation, all aimed at improving work zone safety and the reduction in work zone related crashes.



The Pennsylvania Plan for Safe Work Zones was prepared following industry collaboration. The Plan provides a framework aimed at initiatives concentrated on innovation, new methods to influence driver behavior, and technology advances to ultimately implement the use of connected vehicles.

Connected vehicles use unique communication technologies to “talk” with the driver, other roadway vehicles, and roadside infrastructure. Vehicles that communicate with nearby infrastructure, other vehicles on the road, and sense the environment through technology will, in due course, navigate without human input; removing the potential for human error will provide for safer highway travels with system performance moving toward zero fatalities. The PTC is making strides to adapt its roadway infrastructure for accommodating this changing technology with a P3 Fiber project and by providing for a Regional Connected Smart Work Zone Project in the FY17-18 Highway Program Capital Plan. The PTC also has plans to deploy a connected vehicle pilot within workzones because this technology can beneficial in improving vehicle safety and efficiency, and commute times.

To better manage this new technology, the PTC is pursuing the FHWA grant “Advanced Transportation and Congestion Management Technologies Deployment Initiative”; the intention of the grant is for the development of Advanced Transportation Management Software (ATMS) which would include a connected fleet.



Chapter 3: Review of Planning Products

The mission of the Pennsylvania Turnpike Commission is “to operate a safe, reliable, customer-valued toll road system that supports national mobility and commerce.” The 2016 update of the PTC’s Long Range Plan (LRP) is centered on evaluating the condition and capital needs of the PTC’s Highway, Facilities Energy Management Operations (FEMO), Fleet Equipment, and Technology programs as they relate to their mission, and the strategic drivers as discussed in Chapter 1: Strategic Directions.

This LRP updates the financial realities of the day, and answers several key questions:

- How much revenue can the PTC reasonably expect to receive over the 20-year life of the plan?
- What is the extent of the PTC’s capital needs?
- How large should the Capital Program be?
- What should each program’s share within the Capital Program be?

Our mission is to operate a safe, reliable, customer-valued toll road system that supports national mobility and commerce.

The PTC is responsible for building, maintaining, and operating its roadway. By supporting a sustainable capital program, the PTC is able to balance necessary maintenance activities with new capital investment and establish a coordinated direction for Turnpike infrastructure for years to come. **Figure 4** shows the extent of the Turnpike system across Pennsylvania.

The long range plan is just one of several planning products that the PTC maintains to guide decision-making and investment. At its highest level, the PTC is guided by the tenants of its seven strategic drivers. Newly updated in 2016, the strategic drivers were developed to ensure that the PTC fulfills its responsibilities in meeting today’s operational challenges, while planning for the future. The strategic drivers serve as the basis for the PTC’s goals and objectives, which in turn are the foundation for the department Business Plans.

Figure 4: The Pennsylvania Turnpike System and Surrounding Interstates

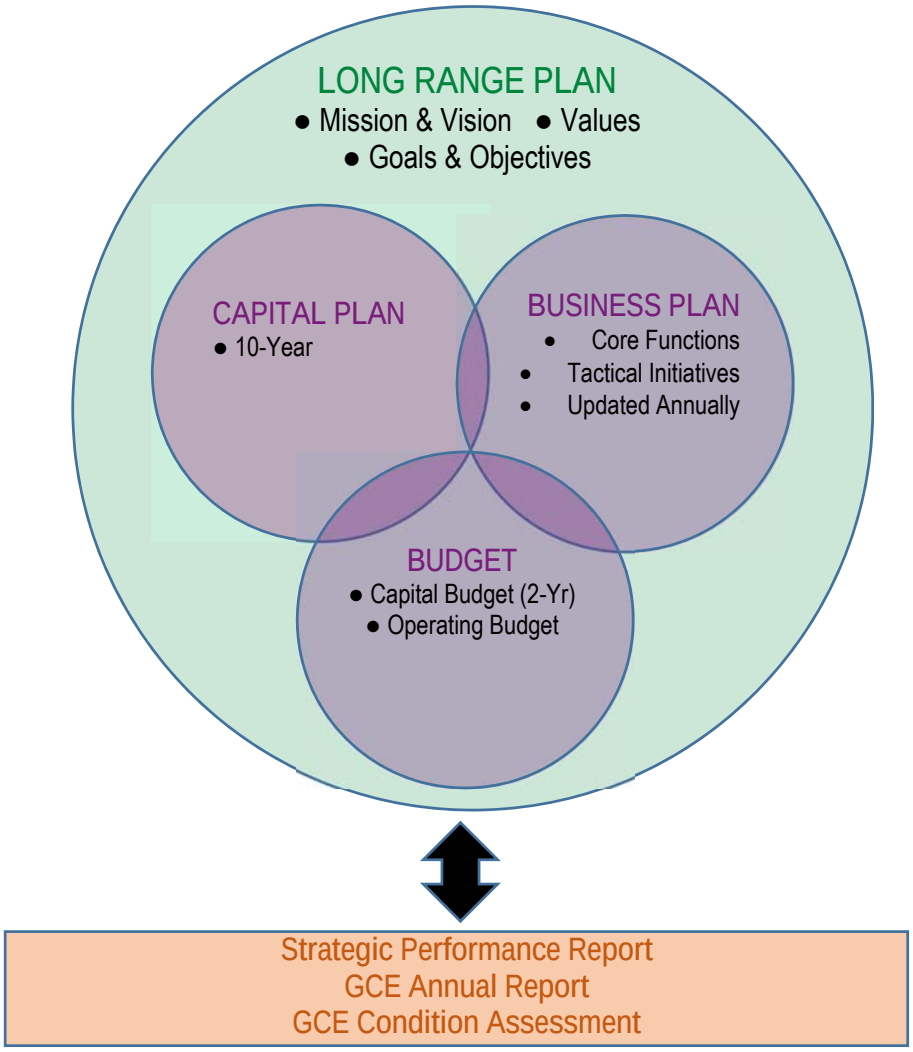
Since 1940 the PTC has been responsible for the construction, operation and maintenance of the Pennsylvania Turnpike, a system now encompassing 552 miles (the "Turnpike"). The Turnpike's facilities include the 359-mile east-west Mainline traversing the southern portion of Pennsylvania that connects with the New Jersey Turnpike in the east and the Ohio Turnpike in the west; the 110-mile north-south Northeastern Extension; the 16-mile north-south Beaver Valley Expressway; the 13-mile Amos K. Hutchinson Bypass near the New Stanton Interchange; completed segments of the Mon/Fayette project totaling 48 miles in length; and a six mile segment of the Southern Beltway.

The Turnpike consists of only 0.5 percent of the state's total roadway network, yet accommodates nearly 6 percent of all travel, or 17.7 million vehicle miles of travel, daily.

Figure 5 shows the LRP's position within the PTC's decision-making framework, and how it influences the PTC's various planning products. The PTC employs several planning products and processes that influences its work programs at various levels. Given the continuous, dynamic nature of the planning process, the products shown at the bottom of the figure (namely, the Strategic Performance Report and General Consultant Engineer's (GCE) Annual Report) provide important feedback and shape future iterations of the PTC's various plans and budgets.

These products and their elements are discussed in greater detail within this chapter.

Figure 5: The LRP's Position within the PTC's Decision-Making Framework[3]



[3] The GCE is the PTC's General Consulting Engineer, responsible for annual reviews of the PTC's draft Operating Budget and Capital Budget, and the preparation of various metrics reports regarding the condition of the physical system, including the Strategic Performance Report. The GCE also performs other engineering and management assignments for the PTC, as requested.

Strategic Plan

The Strategic Plan reveals significant changes in technology, fiscal realities, and customer expectations and assists in managing the shifting industry landscape. The Strategic Plan included input from every Department throughout the organization. Stakeholders engaged in a series of day-long workshops to identify challenges, opportunities and a series of strategic drivers, which are factors not necessarily in the PTC's control, that determine the success or failure of planning efforts. The Strategic Plan serves as a foundation for allocating resources and programming investments throughout the PTC; it also provides clear, measureable performance standards that are used to meet future targets and assess the Plan's effectiveness.

The PTC updated its Strategic Plan in 2016 and made a decision to incorporate its directions as part of this Long Range Plan update. As such, the LRP was updated using the PTC's mission, vision, and strategic drivers to ensure consistency and mutually supportive actions.

Department Business Plans

Each PTC Department is responsible for preparing a Business Plan to clearly define its purpose and establish realistic objectives, measures, and tactical initiatives that are consistent with the Strategic Plan. The Business Plans serve as a roadmap for each Department to ensure that resources are effectively used and key priorities remain in focus.

Certain departments operate in accordance with the Capital Plan while others use the annual operating budget. The departments that operate under the Capital Plan are discussed in more detail within "Appendix D: Review of Departments that Operate Under the Capital Plan" of the LRP. Labor costs within the Engineering Department are borne almost entirely by the Capital Plan. The Capital Plan covers a much smaller share of labor costs within other departments, including FEMO (11%), TE&O (1%), and Information Technology (<1%).

Previous Long Range Plans

In 2003, the PTC developed a LRP to establish a coordinated direction for maintaining and improving its roadways, structures, tunnels, and interchanges for the next 30 years. The Commission developed the 2003 LRP to incorporate future planning into the management process. The strength of the LRP was based upon ideas and perspectives from a diverse set of stakeholders, from both public and private sectors, who were involved in the development process. The direct result of this LRP process was a list of projects for the Turnpike's 10-year Capital Plan, which was the first 10 years of the 30-year 2003 LRP.

Strategic Performance Report

Historically referred to as the Metrics Report, the Strategic Performance Report reflects the performance and progress made toward achieving the goals set forth in the PTC's Strategic Plan for FY15. As such, it summarizes the results for the PTC's strategic objectives. Results are presented in a "scorecard" format, which provides an overview of the PTC's performance.[4]

[4] This report is completed by the PTC's General Consulting Engineer (GCE)

The results from the FY15 report were used within this LRP. More detailed results of the Strategic Performance Report are located in this LRP within Chapter 4: Performance Measures. The report is a performance report on the Strategic Plan, LRP, and Capital Plan. As such, the PTC looks to the report to determine what changes are needed in order to meet its goals.

GCE Annual Report

Section 702 of the Trust Indenture states that prior to adopting the Annual Operating and Capital Budgets, the PTC shall provide a draft of such budgets to the General Consulting Engineer (GCE) in advance of adoption to provide comments.

The purpose of the review is to examine whether the funding levels, proportions, and prioritizations are appropriate to meet the PTC's needs in order to maintain an efficient and safe system. The basis of the Annual Report is found in the Strategic Performance Report and the Condition Assessment Report. As shown previously in **Figure 5**, the GCE Annual Report helps to shape several products, including: the Long Range Plan, Capital Plan, Business Plans, Capital Budget, and Operating Budget.

GCE Condition Assessment Report

Section 705 of the aforementioned trust indenture states that the PA Turnpike System shall be inspected a minimum of every three years and that a report shall be filed with the Trustee as to the condition of the system. With the agreement that was executed in 2001, the responsibility for this report was assigned to the GCE. The focus for the condition assessment centers on four key asset groups of the System – Roadway, Structures, Facilities, and Technology. Summary-level information from this report can be found within this LRP in Chapter 6: Existing Conditions.

Capital Plan

The PTC adopted the FY15 Capital Plan at historic investment levels ($6.73 billion over the next ten years) but is now weighing a more moderate program that balances its debt service while maintaining the condition of the system.[5] This investment has enabled the completion of over 100 miles of total reconstruction across the system. The direct result of these investments to the PTC's customers will translate into a better ride, and improved safety and mobility.

Many sections of the turnpike system that have been reconstructed have also been widened from four lanes to six. In 2013, Michael Baker conducted a study comparing the advantages and disadvantages of reconstructing the turnpike maintaining the existing 4-lane section versus reconstructing and widening the turnpike to a 6-lane section. Due to the significant future costs of widening, current traffic impacts for maintenance, future traffic impacts for construction, decreasing levels of service, and the minimal costs of maintaining the extra lanes, the study concurred with the PTC that reconstruction of the turnpike should include widening to six lanes. This additional capacity will not only improve safety, but enable future maintenance activities to occur with minimal disruption, providing the uninterrupted travel experience Turnpike customers deserve. This significant capital investment is also providing an enormous positive economic

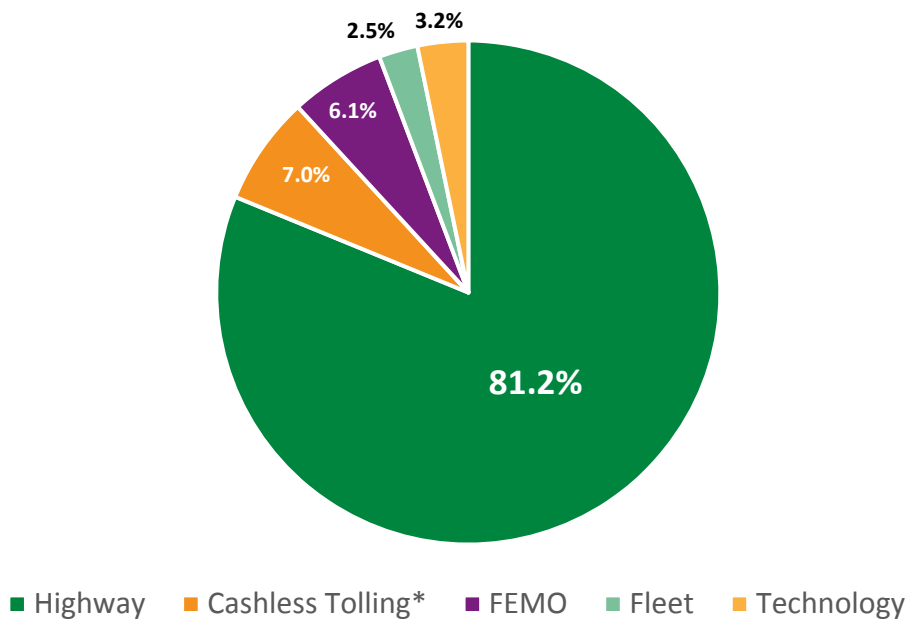
[5] The 10-year Capital Plan is $6.5 billion net of Federal Fund reimbursements.

impact for the Commonwealth. Through the Capital Plan, the PTC aims to deliver and drive toward success.

FY2016-2025 Capital Plan[6]

The Capital Plan proposes a 10-year funding schedule for the purchase, construction or replacement/rehabilitation of the PTC's physical assets. The plan is a balanced portfolio of over 300 projects that, upon adoption, will bring the Turnpike system into a state-of-good-repair and ensure the PTC is able to meet the diverse needs of its customer base. Capital projects fall into one of four capital programs: Highway, Facilities & Energy Management Operations (FEMO), Fleet Equipment, and Technology. **Figure 6** shows each program area's share of the FY16 Capital Plan over the next 10 years. The share attributed to "Cashless Tolling" is also shown in the figure, although it should be noted that this is not a discrete program, but is part of the Interchange Category within the Highway Program. It is highlighted here for its significance to the overall program.

Figure 6: FY16 Ten-year Capital Plan, Share by Program (YOE)[7]

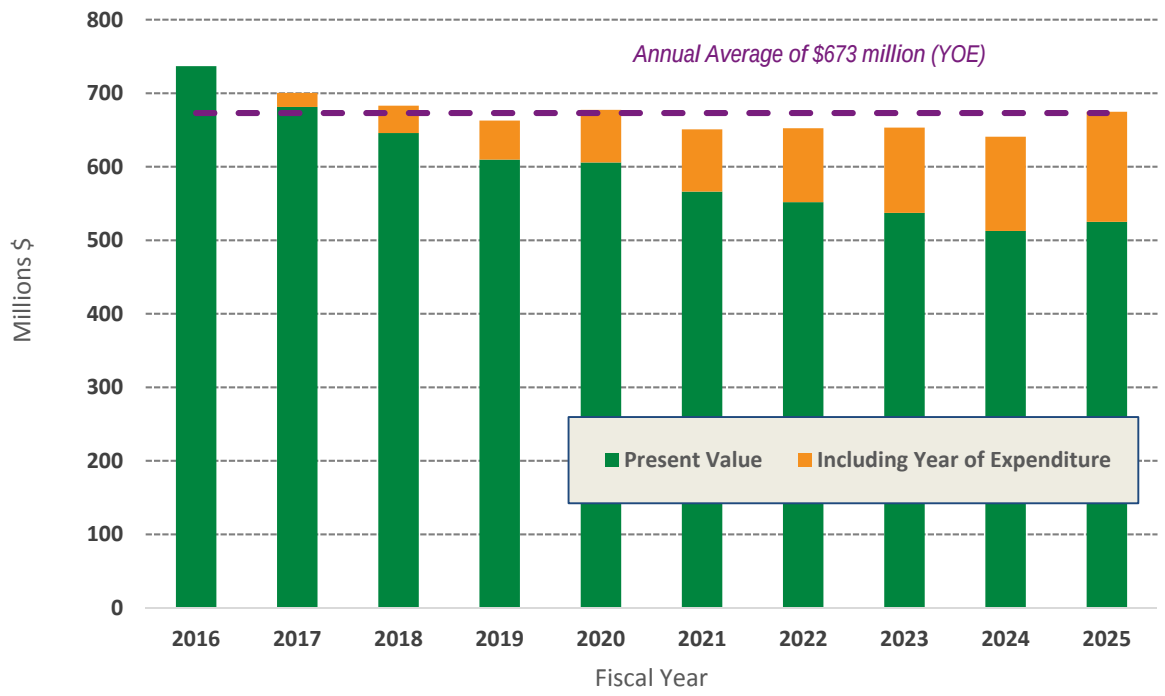


* Part of the Interchange Category within the Highway Program.

Figure 7 shows that capital funding is front-loaded within the FY16 10-year Capital Plan, averaging $673 million a year (YOE). The figure shows funding in both present value and in year of expenditure, which shows the erosion of the PTC's actual buying power over time.

[6] The LRP references the proposed FY16 Capital Plan throughout. The PTC never formally adopted this plan, although the adopted FY15 Capital Plan obligated funding for two fiscal years. Thus, the PTC was operating on an approved "Year 2" of the FY15 Capital Budget. The PTC adopted a FY17 Capital Plan on May 17, 2016.
[7] YOE = "Year of Expenditure", or values expressed in today's dollars to account for inflation.

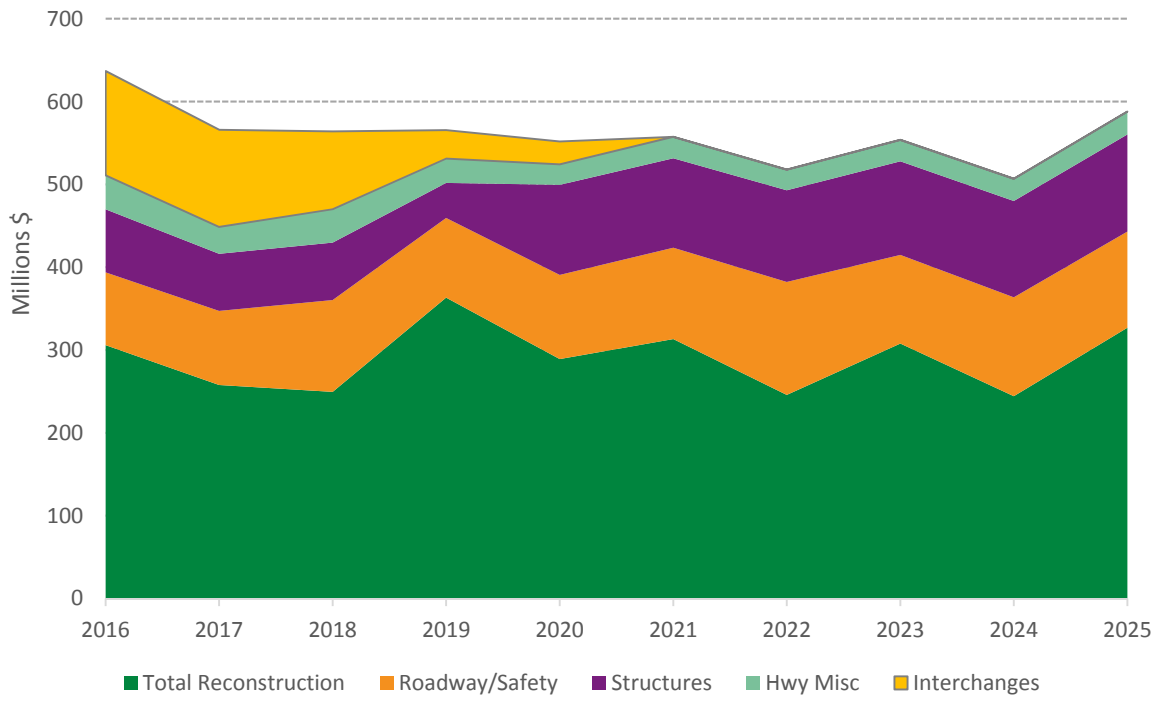
Figure 7: FY16 10-year Capital Plan Funding by Fiscal Year (in PV and YOE, $m)[8]



As noted previously, the Highway Program constitutes the largest portion of the Capital Plan. Just as the Capital Plan is organized into four different program areas, the Highway Program is composed of several *categories*, including: Roadway/Safety; Bridge, Tunnels & Misc Structure; Total Reconstruction; Interchanges (includes Cashless Tolling); and Highway Miscellaneous. Of these five, the Total Reconstruction category constitutes the largest share of spending over the proposed FY16 10-year Capital Plan period, as shown in **Figure 8.**

[8] YOE = "Year of Expenditure", or values that account for the impact of inflation

Figure 8: FY16 10-year Capital Plan Spending by Highway Program Category (YOE, $m)

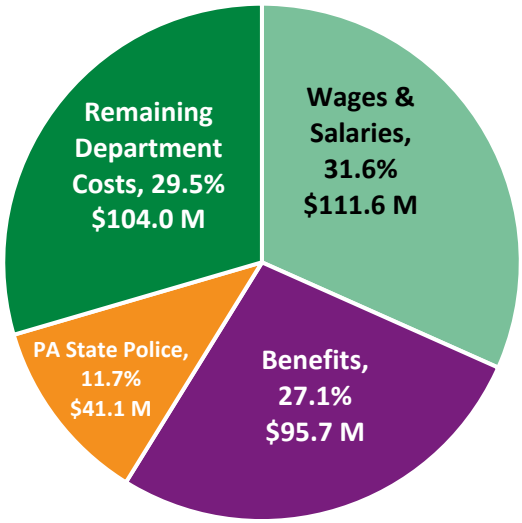


An important change noted in the proposed FY16 Capital Plan (and graphically shown in **Figure 8**) is the elimination of interchange capital funding beginning in FY21. The PTC's move toward Cashless Tolling will eliminate the need for major upgrades and maintenance to the toll plazas.

PTC Operating Budget

In addition to the Capital Plan, the PTC prepares and adopts an Operating Budget. The Operating Budget is an estimate of the expenses needed to maintain, support, and operate the roadway and facilities for the next fiscal year. The PTC approved a $363.4 million Operating Budget for FY16. It is composed of three major groupings, or areas of expenditure: departmental expenses, employee benefits expenses, and Pennsylvania State Police expenses. Drawing from actual expense totals from FY15, **Figure 9** shows the relative share of each category within the PTC's operating budget. As shown in the figure, Wages & Salaries constitutes the largest share.

Figure 9: FY15 Operating Expenses



Note: "Wages & Salaries" is subordinate to "Department Costs" but is highlighted here due to its significance.

As shown in the preceding figure, the largest operating expense comes from the day-to-day operations of the PTC's 17 departments (which includes Wages & Salaries). The FY16 operating budget for the PTC Fare Collection Department is the largest, with $67.8 million allotted. **Table 3** has more details regarding the PTC's FY16 and historic operational expenses.

Table 3: Departmental Operational Expenses for FY12-13 through FY15-16

Operating Expenses	FY13 Approved Budget	FY14 Approved Budget	FY15 Approved Budget	FY16 Approved Budget	% Change 2012-16
Executive	909,302	834,866	825,571	853,801	**-6.1%**
Western Reg. Ofc.	725,965	598,529	566,348	584,178	**-19.5%**
Eastern Reg. Ofc.	833,606	826,096	631,803	634,266	**-23.9%**
Compliance	3,013,530	4,139,062	3,913,565	3,645,602	**21.0%**
Maintenance	64,256,700	66,052,270	67,822,238	67,689,082	**5.3%**
Fare Collection	61,853,661	63,769,210	64,902,231	67,763,083	**9.55%**
Service Centers	22,527,071	23,174,372	24,489,418	28,360,771	**25.9%**
Communications & Public Relations[9]	4,530,578	4,695,997	4,975,131	4,628,618	**2.1%**

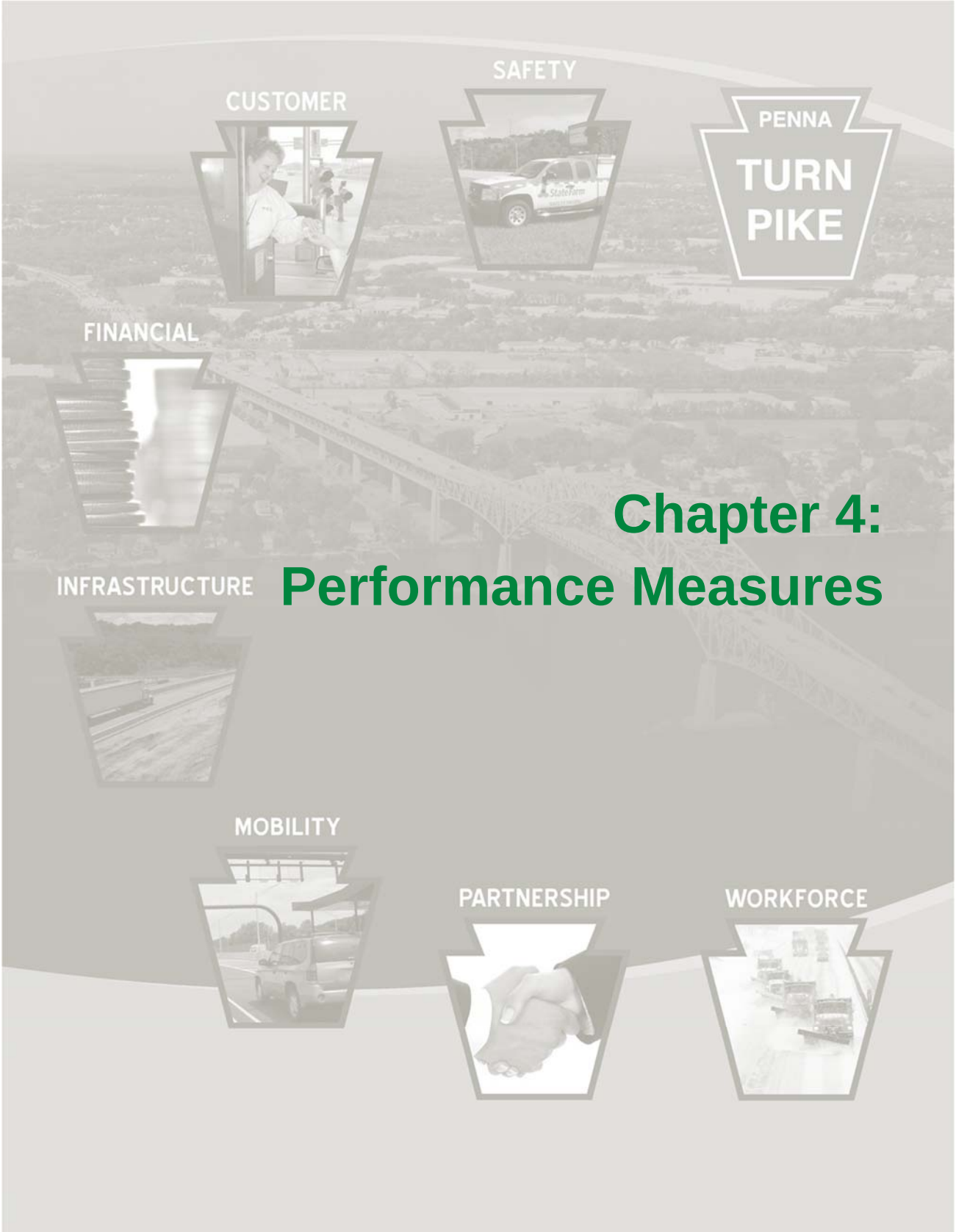
[9] As of FY17, this has become "Public Relations and Marketing." Additionally, "Fare Collection" is now "Toll Collection."

Operating Expenses	FY13 Approved Budget	FY14 Approved Budget	FY15 Approved Budget	FY16 Approved Budget	% Change 2012-16
Information Technology	12,567,802	13,875,744	16,098,953	16,634,915	**32.4%**
Facilities & Energy Management Operations	8,481,411	10,001,023	10,237,882	10,242,629	**20.8%**
Finance & Administration	6,963,139	7,753,718	7,901,329	9,504,670	**36.5%**
Traffic Engineering & Operations	4,586,182	4,677,386	4,315,801	4,441,139	**-3.2%**
Legal	3,204,740	3,110,511	3,791,946	3,284,361	**2.5%**
Human Resources	1,873,277	2,378,064	2,149,284	2,200,018	**17.4%**
Office of Diversity & Inclusion	313,140	509,373	577,383	423,053	**35.1%**
Governmental Affairs	200,175	208,919	212,286	369,085	**84.4%**
Other[10]	6,002,200	6,222,290	6,168,920	6,171,051	**2.8%**
Sub-total Department Expenses	**202,842,479**	**212,827,430**	**219,580,089**	**227,430,322**	**12.1%**

Table 3 documents a recent change by the PTC to transfer personnel costs from the Fare Collection (FC) and FC/ETC System Maintenance contracts from "Fare Collection" to "Communications & Public Relations." "Fare Collection" costs have also been declining due in part to the introduction of E-ZPass and a reduction in fare collection staffing levels.[11]

Additional details regarding the PTC's operating budget can be found in "Appendix B: Operating Budget Details."

[10] "Other" is mainly related to the PTC's budget for accrued legal/tort expenses.
[11] Fare Collection was not the only department where staff moved between departments. This also occurred in Finance & Administration due to the movement of staff from Maintenance to Procurement to create the Procurement & Logistics Department. In addition, the Traffic Engineering & Operations department (TE&O) was formalized in 2014, drawing staff from Engineering and Operations to the new TE&O department.



Chapter 4: Performance Measures

FY15 Strategic Performance Report

Like the Condition Assessment Report, the FY15 Strategic Performance Report reflects the performance and progress the PTC has made toward achieving the goals set forth in its Strategic Plan. The report summarizes results for the time period June 1, 2014 through May 31, 2015 against the PTC's seven strategic drivers (as discussed in Chapter 1: Strategic Directions).[12] The results are presented in a "scorecard" format in providing an overview of the PTC's performance. The PTC uses a rating scale for each measure to characterize the results as "Good," "Fair," or "Poor." Trends are established comparing current results to past performance where data were available.

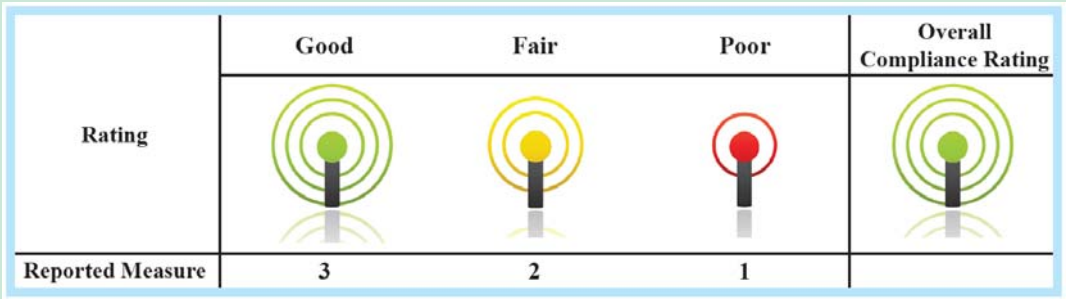
The PTC improved its Metrics Report significantly in FY12 to enhance understanding and the presentation of the results. It added several new metrics for the FY14 Metrics Report that followed the recommendations from the FY12 Report to investigate new areas including Toll Revenue Operations, Customer Service, and Diversity.

The improvements continued in FY15, when the Metrics Report was recast as the Strategic Performance Report and re-organized to summarize the measured objectives providing an organizational valuation for each of the strategic drivers from the PTC's Strategic Plan. As such, the intent was to provide the reader with a comprehensive report of the PTC's performance against the goals set forth in that comprehensive planning document.

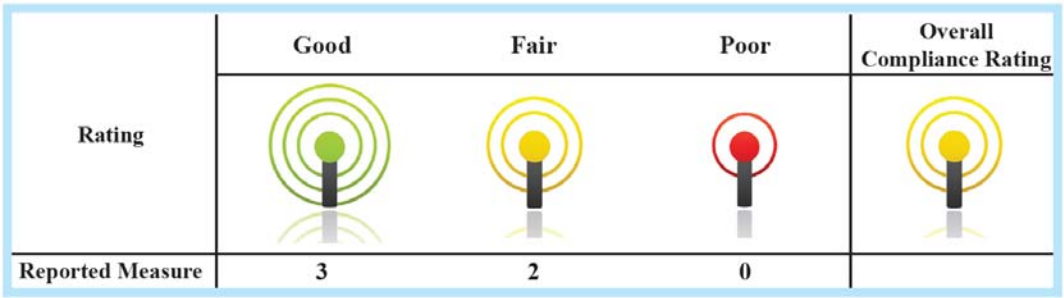
Table 4 summarizes the FY15 Strategic Performance Report.

[12] The Strategic Plan has since been updated and implemented in FY17, with an overall reduction in the number of objectives and measures, and two strategic drivers being renamed.

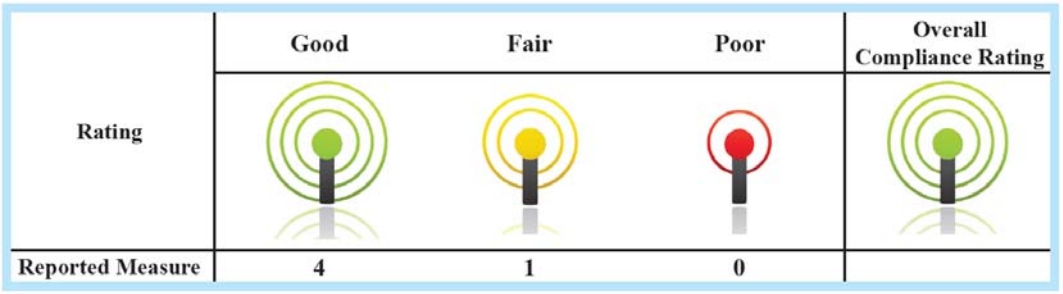
Table 4: FY15 Strategic Performance Report Summary

Strategic Driver	Notes
Safety	**Safety - Fatal crash rate** and the **fatality rate** are rated as "Good" compared to the Pennsylvania statewide average, although both measures have a declining trend (not improving). The crash rate was greater than the statewide average and is rated "Fair." When compared to the 3-year average crash rate on PTC roadways, the trend is improving. While the **work zone crash rate** per construction mile is rated as "Poor," the work zone crash rate per dollars spent on the highway program is rated "Good" with a rate lower than the 3-year average, which is an improving trend. The measure "work zone crash rate per dollars spent on the highway program" is the preferred measure, as it correlates better with safety performance for work zones.
	Incident Clearance Time - The average clearance time for all traffic incidents is rated "Fair" with a steady trend compared to the prior fiscal year.
	PTC Employee Safety - The top cause for workers' compensation claims is slip/fall incidents. A total of 13,885 total safety training hours were conducted in FY15. Prior year data were not available for comparisons.
	Summary: The level of effort based on the Strategic Plan goals for the Safety Driver is rated "Good."  *Two of the eight measures did not have a scorecard.*

Strategic Driver	Notes
Customer	**Customer Service** - The customer service indices, Overall Satisfaction and System Performance, formulated from the annual PTC customer satisfaction survey, are rated "Good" with improving trends**.** The measure for the value customers believe they are getting for their toll dollars is rated "Fair," which is an improving trend.
	Level of Service (LOS) - The percentage of total lane miles that meets the minimum Level-of-Service (LOS) thresholds is 54 percent and is rated "Fair," which is the same as FY14 (adjusted). Overall, there is a steady trend in the percentage of lane-miles meeting the minimum LOS goal.
	Travel Time Index (TTI) – which is expanded to cover the entire PTC system for FY15 – is within expected ranges compared to other similar roadways in the U.S. The measure, TTI, is rated "Good," which is an indication that motorists can travel at or near free-flow conditions along the turnpike during morning and evening peak periods and that travel time along the turnpike is reliable.
	Social Media and Communications - Communication methods with customers are increasing with the use of the PTC website, and relatively new technologies like TRIP Talk, Waze, and Twitter as a means to disseminate traveler information to PTC customers. PTC continues to deploy Intelligent Transportation Systems (ITS) equipment along the turnpike, including Closed Circuit Televisions (CCTV) and Dynamic Message Signs (DMS) that are used to monitor and display traffic conditions.
	Summary: The level of effort based on the Strategic Plan goals for the Customer Driver is rated "Fair."



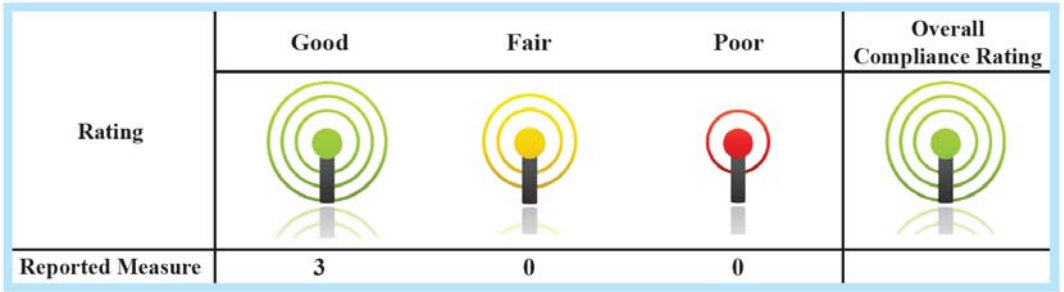
Three of the eight reported measures did not have a scorecard.

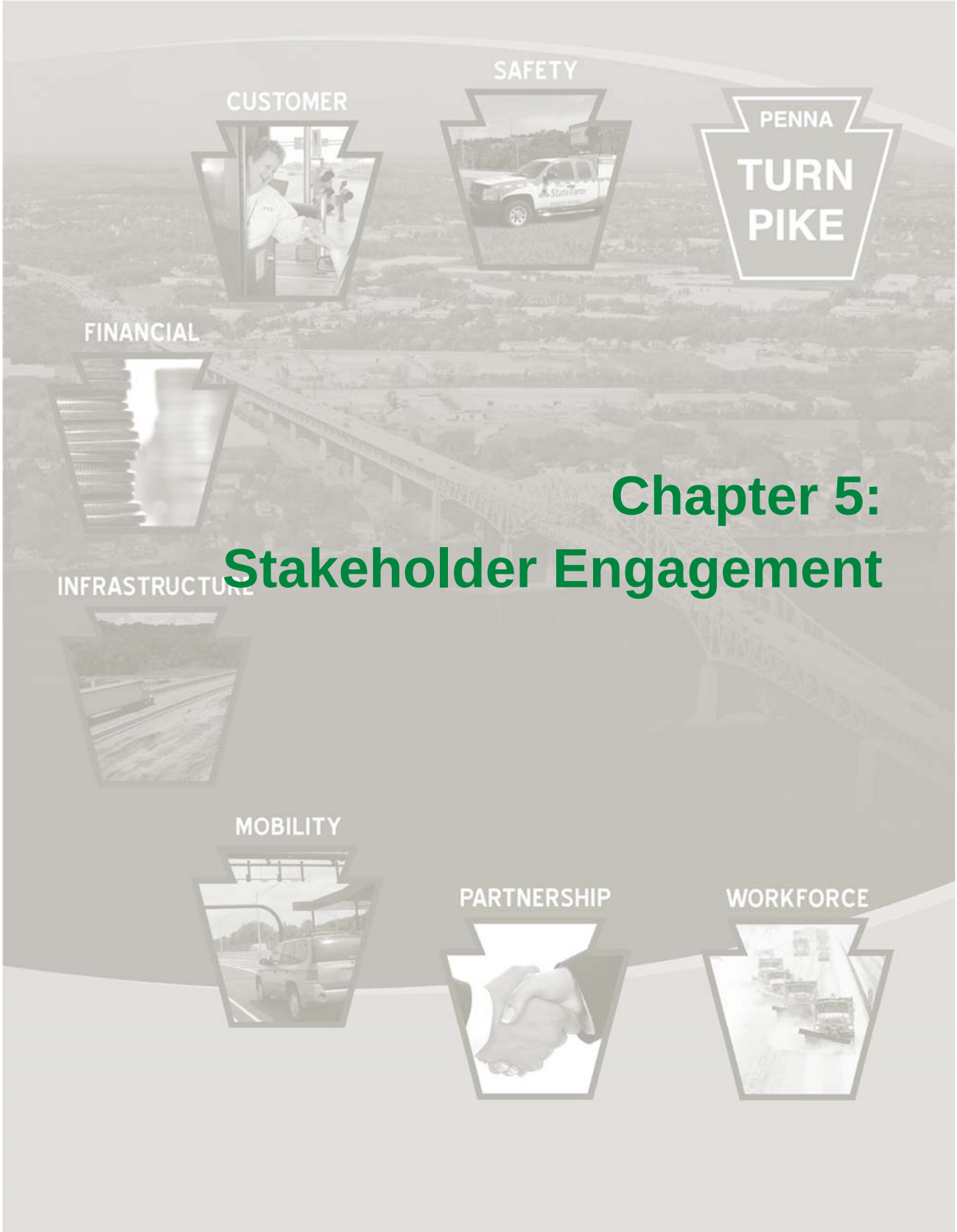
Strategic Driver	Notes
Workforce	**Code of Conduct Training** - The percentage of Commission employees trained in the revised code of conduct and organizational philosophy is rated "Good" with 100 percent training compliance.
	Innovations - Identifying and evaluating innovations is rated "Good." The PTC Innovation Council (IC) serves as a forum to introduce innovations and to facilitate the rapid implementation of technologies, equipment, materials, and approaches within PTC. There were four meetings of the PTC IC during FY15 with numerous innovations discussed and presented. All Ideas Matter (AIM) is a mechanism for PTC employees to provide ideas for consideration for improvement within the organization. AIM began in April 2013, and continues to be used by PTC employees. The measure is rated "Good" with an improving trend.
	Partnerships - Leveraging and creating partnerships with other agencies is rated "Good" with an improving trend. PTC continues to advance initiatives and enhance partnerships with a number of efforts: Mapping the Future, State Transportation Innovation Council (STIC), National Best Practices, and Business Partnerships.
	Diversity - The business diversity measure is evaluated based on participation levels for Diverse Businesses with Engineering Professional Services contracts, Construction contracts, and Job Order contracts. Individually, 83 percent of the Engineering Services Contracts that were completed in FY15 met or exceeded the minimum participation goal and is rated "Fair" with an improving trend. Each of the Construction contracts that were considered met or exceeded the stipulated Diverse Business commitment and is rated "Good" with a steady trend.
	Summary: The level of effort based on the Strategic Plan goals for the Workforce Driver is rated "Good." 

	Good	Fair	Poor	Overall Compliance Rating
Rating				
Reported Measure	4	1	0	

Strategic Driver	Notes
Infrastructure	**Structures** - The PTC maintains 866 bridges and culverts. The percentage of National Highway System (NHS) and non-NHS structurally deficient bridges by deck area is rated “Good” with an improving trend for both measures. The percentage of NHS structurally deficient bridges by count is rated “Fair” with an improving trend. The percentage of non-NHS deficient bridges by count is rated “Good” with an improving trend.
	Pavement - The **Pavement Condition Rating** (PCR) is rated “Good” with an improving trend. The **International Roughness Index** (IRI) is also rated “Good” with a slight decline from FY14. Both **rutting and skid resistance** are rated “Good” with a steady trend compared to FY14.
	Facilities - There are two different rating systems used in the evaluation of PTC facilities. Service Plazas used to use the Facility Condition Assessment (FCA) rating system, while all other facilities evaluated within the report use the Facility Condition Index (FCI). **Service Plazas** are rated as “Good” with a declining trend under the FCA rating system. **Maintenance Buildings** are rated as “Fair” with an improving trend. **Stockpiles** are rated as “Good” with an improving trend. **Toll Plazas and Administration and Fare Collection facilities** are rated “Good” based on the FY15 assessment results.
	Capital Plan Variance - The PTC maintained an acceptable overall variance between the Capital Plan budget and expenditures for FY15. The measure was rated as “Good” with a steady trend.
	Summary: The level of effort based on the Strategic Plan goals for the Infrastructure Driver is rated “Good.”

	Good	Fair	Poor	Overall Compliance Rating
Rating				
Reported Measure	12	2	0	

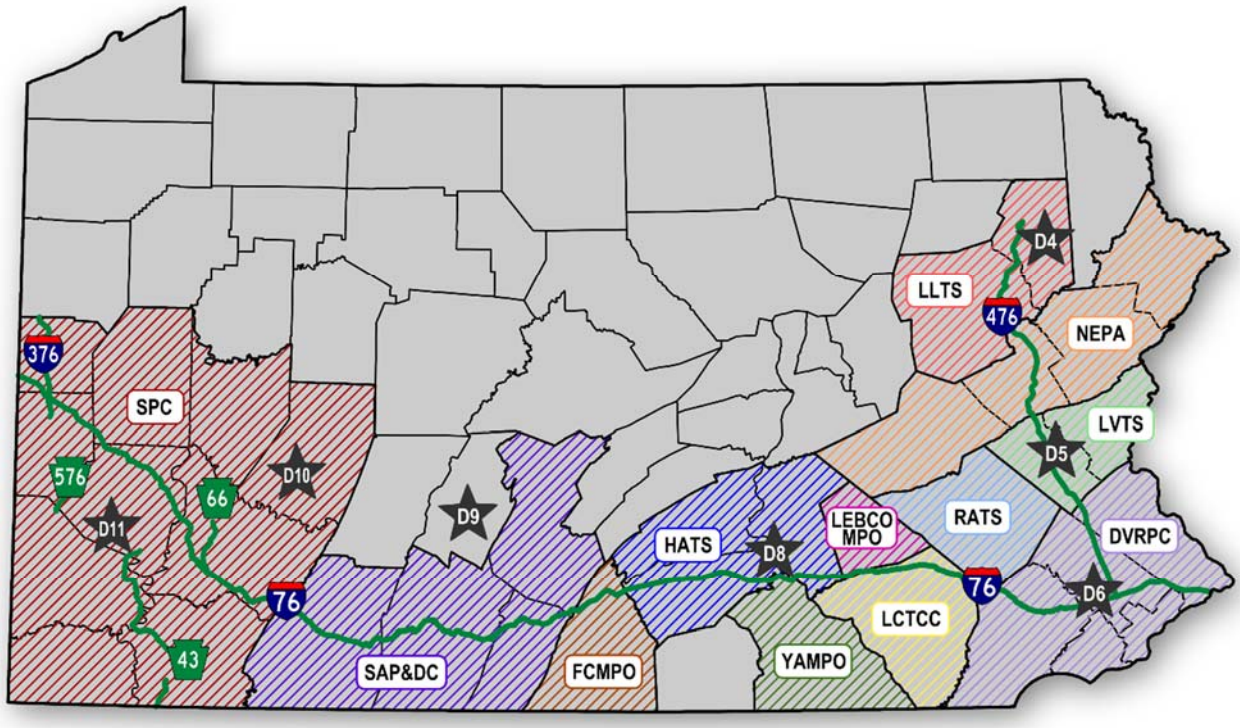
Strategic Driver	Notes
Financial	**Debt Service Ratio, Operating Budget, and Bond Rating** - The Senior Debt Service Ratio is rated "Good". The operating expense budget is rated "Good" and the Bond Rating is rated "Good" with a steady trend.
	Toll Revenue Capital - The overall net toll revenue captured increased from FY14 to FY15 by 7.9 percent, or $68.7 million. However, the percent of net toll revenue captured was 97.7 percent in FY15 compared to 98.2 percent in FY14 which is attributable to an increase in bad debt expense.
	Non-Toll Revenue - There is an increase in other operating revenue by nearly 14 percent, or $4.8 million from FY14 to FY15. Most of the revenue is attributable to fee revenue from toll violations. PTC has leveraged its partnerships with other businesses to increase non-toll revenue sources. The areas in which the PTC is pursuing opportunities to increase revenue include lease and rentals, ATM revenue, and gas royalties.
	Summary: The level of effort based on the Strategic Plan goals for the Financial Driver is rated "Good."  *Four of the seven measures did not have a scorecard.*
Mobility	**E-ZPass Usage** - E-ZPass usage has been steadily increasing year over year for over a decade. The percentage of E-ZPass transactions was 74 percent in 2014 and amounted to $621.1 million in revenue from E-ZPass usage which was 70 percent of total revenue. When compared to 2013, there was a 3 percent increase in the number of E-ZPass transactions, a $40.8 million increase in revenue, or a 7.1 percent increase over 2013.
	Summary: The level of effort based on the Strategic Plan goals for the Mobility Driver is rated "Good." *The one measure reported did not have a scorecard.*
Partnership	The PTC continues to forge positive, collaborative partnerships with governmental stakeholders to maintain strong working relationships. There are no measures evaluated for this Driver due to a lack of available data.
	Summary: The level of effort based on the Strategic Plan goals for the Partnership Driver is rated "Good." *No measures were reported on.*



Chapter 5: Stakeholder Engagement

In addition to compiling existing data from previous plans and studies, PTC staff conducted a series of stakeholder coordination meetings to obtain information and insights relative to other land use, transportation, and economic development initiatives that may have bearing on the PTC's Capital Plan and Long Range Plan. The PTC conducted a total of 10 stakeholder meetings across the state: at PennDOT Districts 4, 5, 6, 9, and 10, and the PTC's Central Administration Building. The Delaware Valley Regional Planning Commission (DVRPC) and the Southwestern Pennsylvania Commission (SPC) each hosted two additional meetings apiece. **Figure 10** illustrates the various PennDOT Districts and planning partner regions that the turnpike traverses.

Figure 10: Stakeholder Outreach Meeting Locations



- Delaware Valley Regional Planning Commission (DVRPC)
- Franklin County Metropolitan Planning Organization (FCMPO)
- Harrisburg Area Transportation Study (HATS)
- Lackawanna-Luzerne Transportation Study (LLTS)
- Lancaster County Transportation Coordinating Committee (LCTCC)
- Lebanon County Metropolitan Planning Organization(LEBCO MPO)
- Lehigh Valley Transportation Study (LVTS)
- Northeastern Pennsylvania Alliance (NEPA)
- Reading Area Transportation Study (RATS)
- Southern Alleghenies Planning & Development Commission (SAP&DC)
- Southwestern Pennsylvania Commission (SPC)
- York Area Metropolitan Planning Organization (YAMPO)

A total of 101 individuals participated in the stakeholder coordination meetings. The discussion topics for each meeting were established through an agenda and a PowerPoint presentation. The PowerPoint presentation highlighted a series of "Fast Facts" pertaining to the PTC's overall transportation system, a summary of its 2014 Strategic Plan, an overview of its long range plan and capital planning update initiative, and an introduction to the following meeting discussion topics that were further detailed with general discussion questions on the following topics:

- Major projects
- Congestion and commerce
- Goods and service movements
- Decade of Investment projects
- New access points and coordinated improvements with adjacent roadways
- Interstate tolling
- Technology advances (e.g., Autonomous Vehicle Technology, etc.)
- Emergency preparedness and incident response
- Communications

A copy of the PowerPoint presentation and a list of the general discussion questions can be found in **Appendix A** of this plan. **Table 5** provides an overview of the discussion themes most commonly raised among all 10 stakeholder meetings.

Table 5: Recurring Themes Raised by Stakeholders

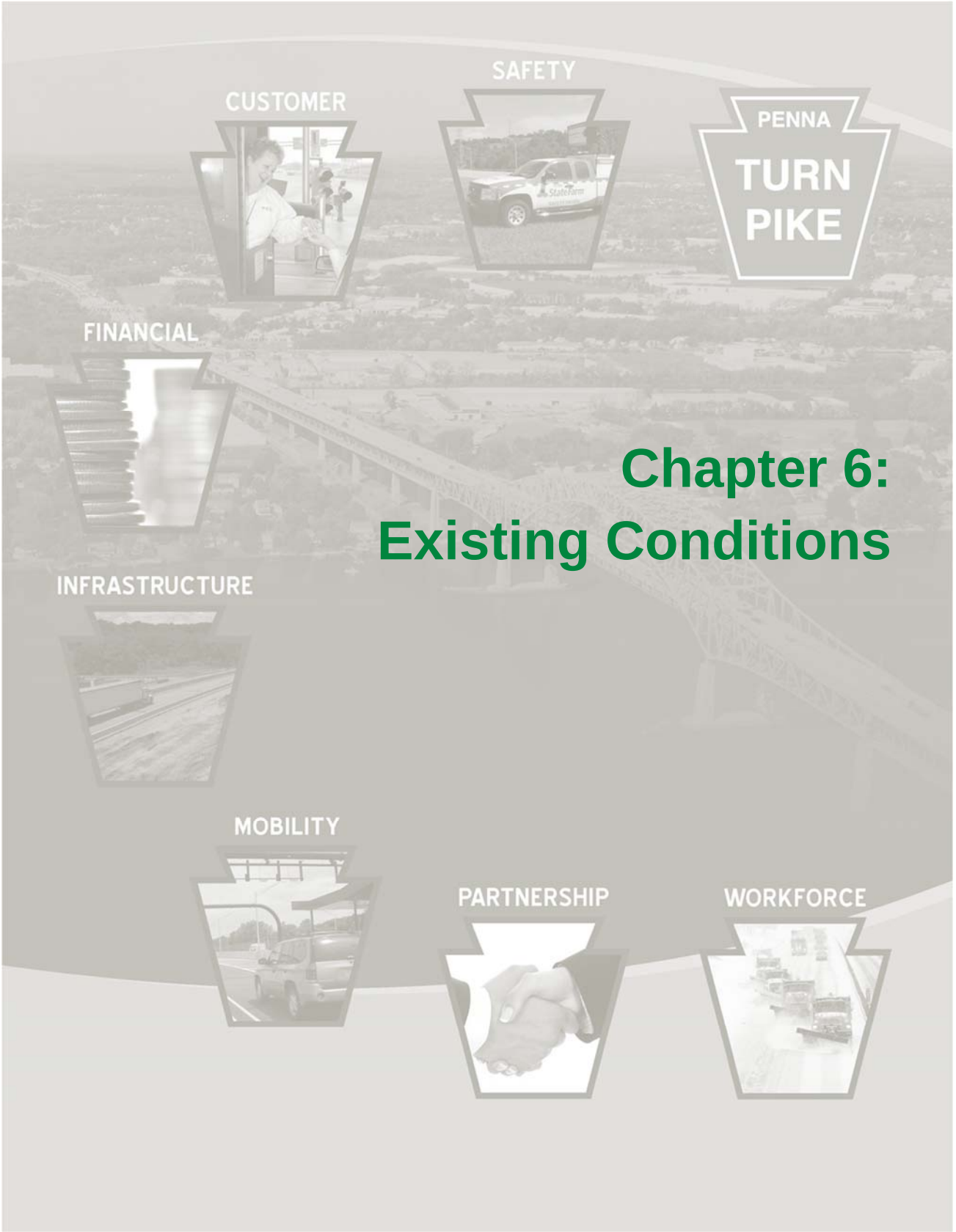
Discussion Topic	Recurring Themes
Cashless Tolling	▪ The move to cashless tolling is taking a phased approach. The PTC will be installing entry cameras over the next several years to capture license plate information as vehicles enter the turnpike. ▪ Act 89 did not include language on reciprocity and enforcement agreements with other state DOTs and this adds difficulty for billing and collecting from out-of-state drivers. Legislation will be needed in order to fully integrate the turnpike with cashless tolling. ▪ Once reciprocity legislation is enacted, cashless tolling will take a regional approach to converting from the current ticket system. ▪ The initial rollout of cashless tolling is based on a pilot program
Increased use of Turnpike for commuter purposes	▪ In certain areas of the state, such as near Philadelphia, the turnpike is used as a commuter road. ▪ Additional interchanges may benefit turnpike users who use the roadway for commuting purposes. ▪ More people may use the turnpike for commuting when it is widened to six lanes or when it is fully automated.

Discussion Topic	Recurring Themes
New Cashless Tolling Access Points and Interchanges	▪ Once cashless tolling is in place, the creation of new turnpike interchanges will be less expensive. ▪ The PTC reviews requests for new interchanges. Requests can come from municipalities, MPOs or other PTC business partners. The PTC relies on its business partners for most of these requests because they have the most up to date information on changes in land use in their respective areas. The business partners obtain and provide to the PTC information to justify the need for the new interchange. ▪ The PTC is working on a toolbox to use for evaluating potential new interchanges. ▪ There may be opportunities for public private partnerships for new interchanges to business parks. ▪ Meeting stakeholders proposed new interchanges be considered at the following locations: o PA 743 (Hershey) o Carlisle Area o I-70 connection at Breezewood o US 219 in Somerset o PA 68 in Beaver County o At Saxonburg Boulevard, PA 28 and PA 380 (Allegheny County) o Uncompleted sections of Mon-Fayette and Southern Beltway projects to include several new interchanges o PA 981 in Westmoreland County
Park and Rides	▪ Meeting stakeholders expressed a need for new park and rides throughout the turnpike system; there are several turnpike interchanges where motorists have created informal park and ride locations. ▪ Stakeholders suggested that the PTC consider opportunities to connect other existing park and ride locations to the turnpike; Bus Rapid Transit (BRT) is being proposed in several locations. ▪ There may be a need for a park and ride at every interchange if the PA 51 to I-376 project is constructed because it would become a commuter route.
Intelligent Transportation Systems and Communications	▪ The PTC currently has a TRIP Talk app which provides warnings through texts and audio ▪ Stakeholders recommended that PTC partner with PennDOT on 511PA to provide travel information via a single source ▪ Dynamic Message Sign systems should be used more – particularly for incident management

Discussion Topic	Recurring Themes
Traffic Incident Management Coordination	▪ PTC should participate in regional Traffic Incident Management (TIM) programs/committees and local TIM teams[13] ▪ PTC should be proactive in developing regional TIM teams/programs ▪ More information is needed on sheltering in place for truck drivers as there have been instances where drivers have been cited for accidentally detouring in improper areas when there is an accident on the turnpike ▪ PTC should look into additional emergency service access points (such as between sound walls) and improve gate accessibility and sliding barriers within the median ▪ PTC should develop and implement a standard Pennsylvania State Police incident clearance procedure
Developments of Regional Significance Impacting the Turnpike	▪ Meeting stakeholders discussed the following developments which may have an impact on the turnpike: o Redevelopment of the Willow Grove Air Force Base in Montgomery County o New construction associated with development of an inland port in the Lehigh Valley o Proposed development at Cool Valley site in Cecil Township, Washington County will impact the Turnpike's proposed Southern Beltway Interchange at I-79/Morganza Road o Development at Almano and Carrie Furnace sites will impact design of PA 51 to I-376 project on the Mon-Fayette Expressway between Braddock and Pittsburgh o Potential impact if Shell's ethane "cracker" plant is developed in Beaver County o Freedom Road project is moving ahead; changes could impact on Cranberry/US 19 interchange ▪ Major distribution center on US 19, Jackson Twp. o A large development is planned for construction in North Cornwall Township (Lebanon County) ▪ Rutherford Rail Yard (Dauphin County) will be increasing capacity by 50 percent, which will increase truck volume

[13] The PTC delivered approximately 12 FHWA TIM courses during 2014 and 2015 to over 600 responders along the system. PTC employees are also members of regional TIM teams.

Discussion Topic	Recurring Themes
Service Plazas and Increased Truck Driver Amenities	▪ Stakeholders indicated that more service plazas are needed along the eastern and western portions (near Pittsburgh and Philadelphia) of the turnpike. ▪ Truck driver amenities such as showers, sleepover facilities, and internet connections should be considered for service plazas. ▪ CNG facilities have been installed at the New Stanton service plaza, and additional locations should be considered. ▪ The PTC is currently conducting a study for increasing truck parking capacity.



Chapter 6: Existing Conditions

The Long Range Plan presents needed investments across the PTC's transportation infrastructure through the year 2035. The following subsections outline the investment needs across each of the program areas. A summary is presented in **Table 6**.

Table 6: Summary of the PTC's Transportation Infrastructure

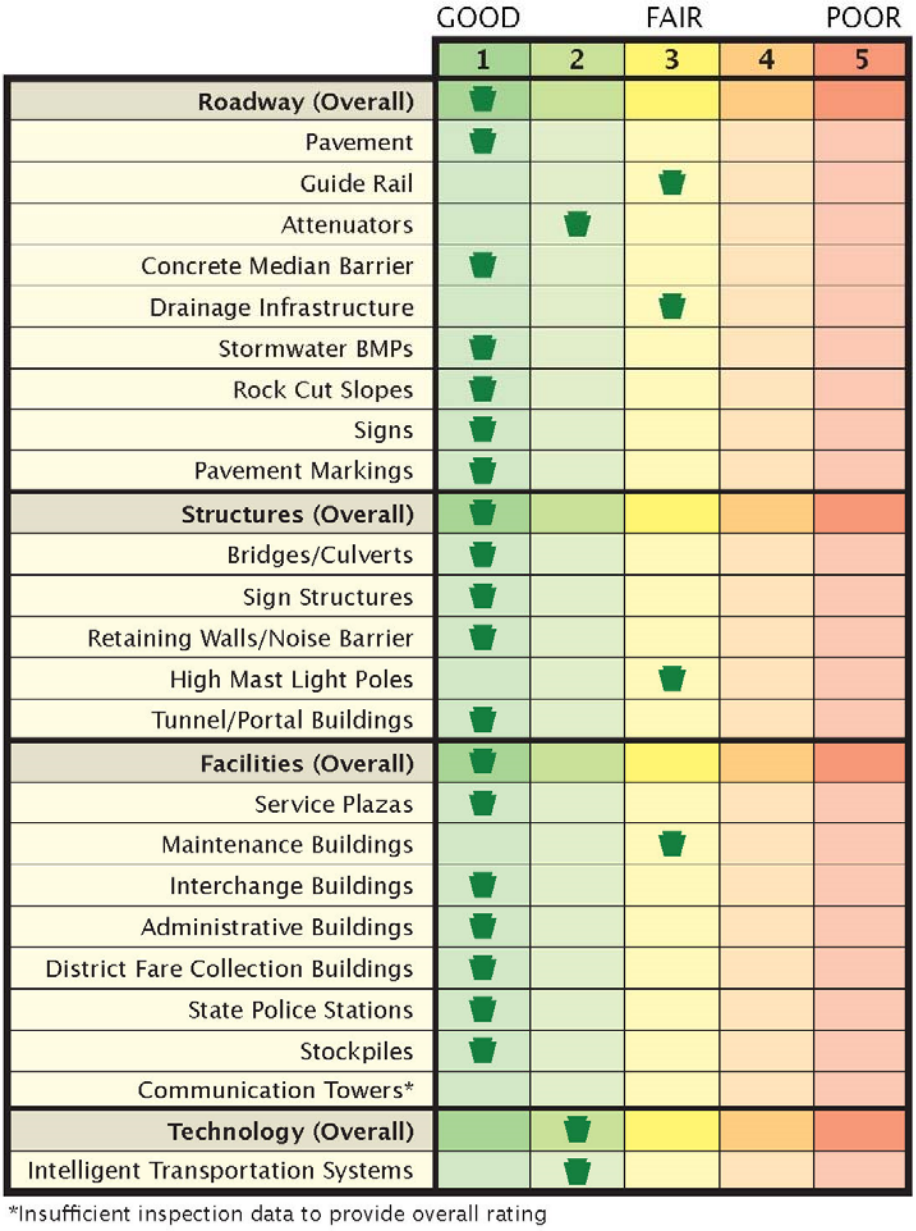
Asset Type	Description
Roadway	▪ 552 linear miles ▪ 359 Mainline ▪ 110 Northeast Extension ▪ 48 Mon/Fayette Expressway ▪ 16 Beaver Valley Expressway ▪ 13 Amos K. Hutchinson (Greensburg) Bypass ▪ 6 Southern Beltway ▪ 79 interchanges ▪ ITS: 66 DMS; 60 CCTV; 22 Roadway Weather Information Systems; 1,027 Emergency Call Boxes
Structures	▪ 866 bridges ▪ 618 Mainline ▪ 248 Overhead ▪ 5 tunnels ▪ Allegheny ▪ Blue Mountain ▪ Kittatinny ▪ Lehigh ▪ Tuscarora
Facilities	▪ Administration buildings: CAB, TIP/TOC, EPD, WRO, and ERO o 67 fare collection facilities o 11 salt storage facilities o 22 maintenance facilities o 17 service plazas o 10 State Police stations o 2 training sites
Technology	▪ Computer systems and application technologies ▪ Microwave backbone ▪ Radio towers ▪ Communication systems
Fleet	▪ 3,600 units of fleet equipment (dump trucks, pool cars, tractors, mowers)

Condition Assessment (2014)

The Trust Indenture states that the Pennsylvania Turnpike System shall be inspected a minimum of every three years and a report be filed with the Trustee as to the condition of the System. The report shall state whether the System has been maintained in good repair, working order, and condition since the last inspection report, and contain any recommendations as to revisions or additions to the PTC's annual Capital Budget. The General Consulting Engineer (GCE) is responsible for assessing the condition of the system every three years (beginning in FY12) and preparing a condition assessment report.

The report provides an overview of key system assets, who inspects them, and the frequency of inspections. Inspection information prepared by PTC staff or its consultants for various system features, supplemented by observations of the GCE, is used for efficiency and coordination. Best practices of similar agencies are reviewed and as appropriate, recommendations will be made insofar as compiling and utilizing condition asset information. The report provides recommendations on current conditions of assets as well as recommendations to improve future condition assessments to better evaluate the assets of the system. As shown in **Figure 11**, the overall condition of the PTC system is rated "Good," except for specific areas noted in the report.

Figure 11: Conditions Report Summary, 2014



Source: PA Turnpike Condition Assessment Report (2014)

There is a need for better compilation, revision, and designation of the condition data for many of the assets for ease of accessibility and condition evaluation. For several of the assets, there is reference to procurement of management systems that should be designed to integrate with the development of a proposed enterprise-wide Asset Management System. Conclusions and recommendations of this report, along with the FY15 Strategic Performance Report, will support future capital and operational planning.

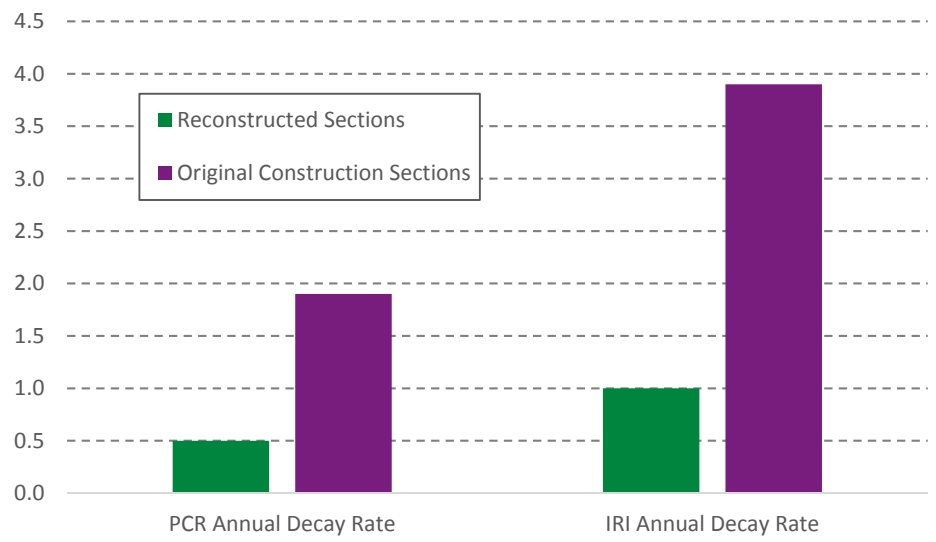
A more detailed summary of the Turnpike's assets follows.

Roadway

Much of the Mainline and NE Extension date to the original construction in the late 1930s through the 1950s. While the roadways have been continually maintained and overlaid, the pavement system has exceeded its expected life, leading to the need for more frequent maintenance. Additionally, the original roadway cross-sections do not meet current lateral and vertical clearance standards. Portions of the turnpike have also experienced recurrent congestion as traffic volumes have increased beyond available capacity. Rock cut and embankment slopes have required monitoring, maintenance, and re-stabilization.

The "total reconstruction" of the turnpike began in 1999. This extensive reconstruction process involves complete replacement of the roadway infrastructure, including structures. As of the writing of this plan, the PTC has reconstructed 116 miles of the turnpike, while an additional 19 miles are currently under construction. Another 123 miles are in design. **Figure 12** demonstrates how total reconstruction has positively affected pavement decay rates on the turnpike, as measured against both PCR and IRI. As shown in the chart, sections of the turnpike that have been reconstructed decay nearly four times slower compared to the original sections.

Figure 12: Pavement Decay Rates



Source: Michael Baker analysis

Many of the 43 interchanges on the Mainline and Northeast Extension date to their original designs in the late 1930s through 1950s.[14] These facilities are challenged to meet current and future traffic demands, safety concerns, and customer expectations. The introduction of cashless tolling has delivered benefits in processing speeds and improved safety. The Turnpike currently operates with manual and electronic toll collection at most interchanges.

[14] There are 79 interchanges throughout the Turnpike system.

Cashless Tolling is part of the PTC's "Interchanges" category within the Highway Program, yet is treated within this LRP as a separate line item for planning purposes. The PTC began a staged implementation to a cashless, nonstop travel system in January 2016 with the opening of the first highway speed cashless tolling point on the mainline at the Delaware River Bridge. The next targeted opportunities for conversions will involve the tolling points that are not part of the existing ticket system, including the northern end of the Northeast Extension, Beaver Valley Expressway, Mon/Fayette Expressway, and the Greensburg Bypass.

Assuming the successful implementation of the above tolling points, the next goal of the conversion is to use the existing toll plazas and express lanes within the ticket system to allow cashless tolling at all tolling points (also referred to as "cashless tolling-in-place") by 2022. In 2022 and beyond, the PTC is planning to convert the entire system from cashless tolling-in-place at traditional mainline and ramp tolling plazas to highway speeds with mainline overhead tolling structures.

Figure 13 outlines the phased approach the PTC is taking regarding the implementation of cashless tolling.

Figure 13: Targeted Opportunities for Cashless Tolling Implementation

CASHLESS TOLLING CONVERSION OF THE OPEN (NON-TICKET) SYSTEM	*CASHLESS TOLLING-IN-PLACE CONVERSION OF THE TICKET SYSTEM*	*FULL IMPLEMENTATION SYSTEM-WIDE*
2016 to 2020	***2020 to 2022***	***2022 and beyond***
First transition to cashless tolling begins with the Delaware River Bridge	**Cashless tolling-in place conversion of the ticket system**	**Highway-speed cashless tolling: from traditional ramp tolling plazas to overhead highway structures**
In January 2016, cashless tolling was implemented in eastern Pennsylvania when the first high-speed cashless tolling opened on the Delaware River Bridge. By the end of 2020, cashless tolling will be implemented on the Mon/Fayette Expressway, Beaver Valley Expressway, Greensburg Bypass, and the northern end of the Northeast Extension.	By 2022, the PTC will convert all tolling points within the existing ticket system to cashless tolling-in-place. This includes the Gateway toll plaza near the Ohio line, Wyoming Valley toll plaza along the Northeast Extension, and the new Neshaminy Falls toll plaza near the New Jersey line.	The goal of the final stage is to convert the entire system from cashless tolling-in-place at traditional ramp and mainline toll plazas to highway speed cashless tolling with overhead tolling structures along the mainline. Details of this stage are still in development, but a phased approach is anticipated.

Structures

There are 866 structures on the Turnpike system. These structures include bridges that carry the turnpike over watercourses, roadways, and railroads. There are also bridges that carry roadways and railroads over the turnpike, and are associated with interchanges and culverts. Approximately 47 percent of the Turnpike's structures are less than 100 feet long. Major structures, defined as structures over 300 feet long, comprise approximately 17 percent of the system.

The PTC measures its bridge performance by the percentage of structurally deficient bridges by number and deck area. In this regard, the PTC compares favorably to its counterparts nationally, including PennDOT. On the Turnpike system, 4.5 percent of total bridges are structurally deficient, compared to a Pennsylvania state rate of 22.3 percent. The more meaningful bridge condition measure, however, is that of deck area. By this measure, the Turnpike's SD bridge deck area is currently rated at 3.7 percent, compared to a state rate of 13 percent.

Table 7 depicts how the PTC's bridge conditions compare favorably against state and national rates, by network. One of the PTC's Strategic Directions is to "maintain the number and weighted percentage of structurally deficient bridges by deck area." The PTC's bridge conditions far exceed state and peer agency rates against total deck area that is SD. The PTC will continue to strive to maintain its SD rate, as it is comparable to the national rate for interstates. As of the writing of this plan, all bridges currently designated as SD are either in design or construction for rehabilitation or replacement. The PTC also strives to address the needs posed by heavy haulers and overweight vehicles.

Table 7: Percentage of Structurally Deficient Bridges, by Owner, by Network

Agency		NHS & non-NHS	NHS	Non-NHS	Interstate
FHWA	by Count	10.0	4.2	11.9	3.8
	by Deck Area	7.1	6.0	8.7	*5.4
PTC	by Count	4.5	4.6	4.4	4.6
	by Deck Area	3.7	3.6	4.0	3.6
PennDOT	by Count	22.3	9.9	26.5	3.9
	by Deck Area	13.0	9.0	19.4	5.5

Source: FHWA; PennDOT 2014 Performance Measures Annual Report; and PTC PONTIS
**estimated*

In spite of the PTC's favorable bridge condition ratings, more than 64 percent of the PTC's structures are over 40 years old, many dating from the original turnpike construction. With a design life of 75 years, many of these structures are at or nearing the end of their anticipated life. Over 61 structures currently have Bridge Management System (BMS) ratings signifying the need for rehabilitation or replacement. Most structures over the turnpike do not provide the current design standard of 16' minimum clearance. Over the last several years, the PTC has on average been "turning over" 5 new or rebuilt bridges each year to local government after a Total Reconstruction project.

The PTC currently operates five tunnels, each with two tubes and two lanes per tube. The opening dates of the tubes vary from 1940 (four tubes) through 1991 (second Lehigh tube). All of the tubes meet the 16'-6" minimum vertical clearance, with the exception of the original Lehigh tube (14'-9"). The original 1940 tubes have major deficiencies in ventilation equipment, waterproofing (ceiling slabs), lighting and power supply, and traffic levels of service. As tunnels age, their maintenance requirements increase. For some of the older tunnels, bypassing them is a possibility, as has been completed in the past. As of the writing of this plan, the first major tunnel rehabilitation project is in design and will be ready for construction within two years.

Facilities

Major trends affecting the FEMO Program include the widening of the turnpike to three lanes in each direction. The widening impacts future planning on many levels, from building and shed relocation to interchange relocation. One of the program's priorities moving forward involves replacement of its maintenance sheds, as many are at or beyond their useful life span. Many are too small to accommodate existing truck sizes. FEMO has developed a model garage standard that outlines design parameters, including CNG. Upgrading the maintenance garages to bring them up to current building codes would provide the PTC with another 50 years of useful life for these facilities.

The department manages $500 million in physical assets and requires $21 to $23 million annually to perform basic maintenance activities. High level needs include:

- **Maintenance sheds** (and how the widening of the mainline affects them). The PTC is in need of a replacement program for these assets – many are at or beyond their useful life span and in some cases are too small to be able to accommodate today's larger trucks. The FY15 Strategic Performance Report noted that these structures are in overall "Fair" condition, as opposed to the "Good" condition of most assets.
- **Tunnel maintenance and tunnel management and disposition**
- **Inventory** (how the department maintains its inventory overall)
- **Public water and sewer connections** – The costs of maintaining on-site water wells, septic systems, and connections to public water systems continue to grow. The PTC has been actively trying to connect to public utility systems where possible. In many locations however, this is not possible, given the location and/or availability of public services. This will continue to be an ongoing expense for the PTC.

- **Fuel Distribution** - This is another long-range issue. Future consideration needs to be given to whether the PTC should continue to handle fuel distribution internally, or outsource it. Other long-range issues include the types of fuel to be used, whether it is to be propane, CNG, electric, or other sources.
- **Energy Management** - This involves the PTC's use of electricity and natural gas, as well as operation of its buildings.
- **Security** - Over time, the department will need to examine how it administers security.

Technology

The PTC is facing several, macro-level trends that are affecting future investments in technology:

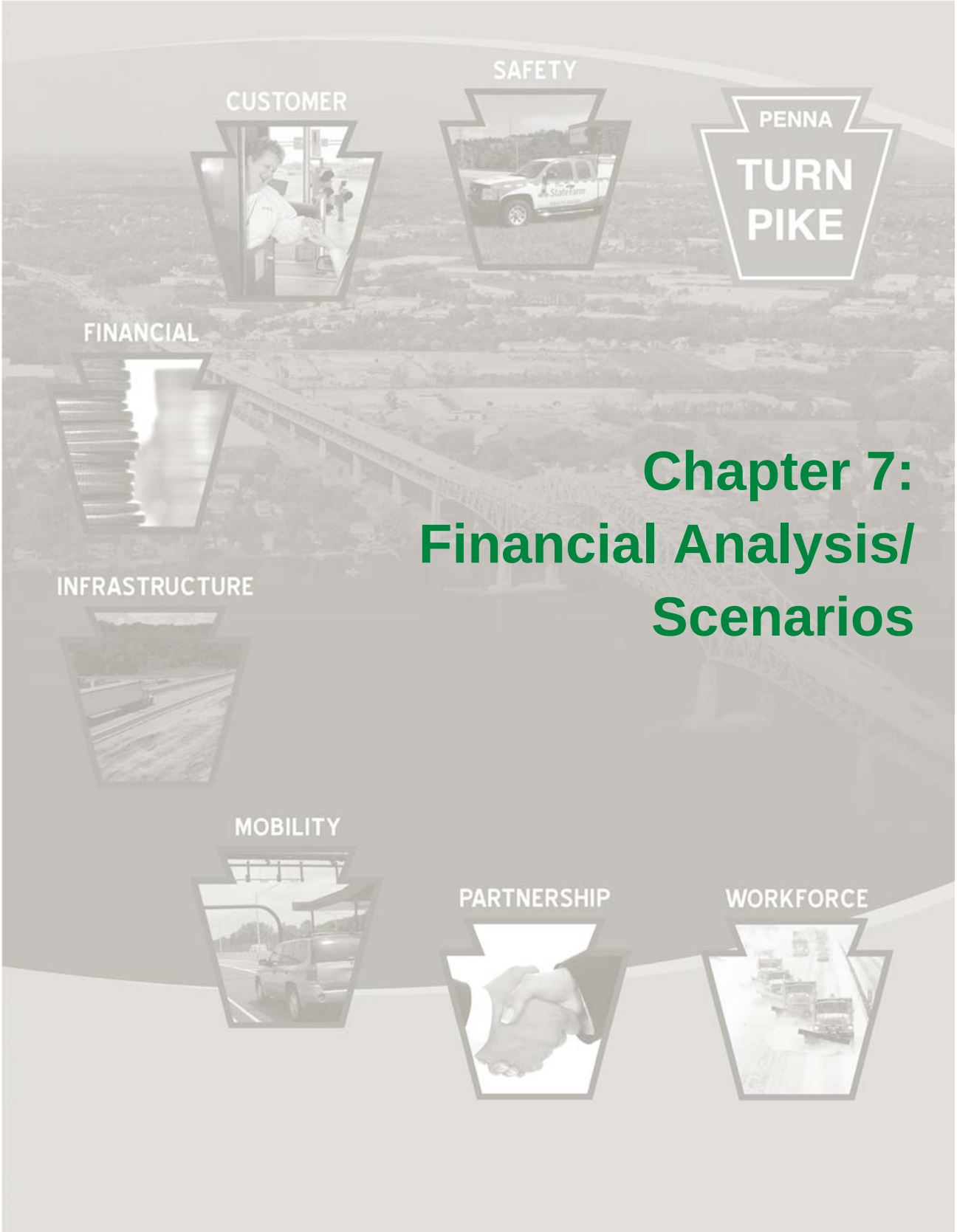
- **Mobility** – The PTC has a mobile workforce, which needs to be supported. Workforce enablement means having the ability to have work orders presented on tablets and minimize data entry errors. IT translates into getting as much information into the workers' hands as quickly as possible. In addition to work order management, this technology can be used to improve inspections, inventory management, and alternative ways of monitoring and measuring road conditions.
- **The Cloud** – Increasingly the IT industry in general is shifting to cloud-based services. The PTC is using some Cloud services today and has a number of applications hosted externally. This number will grow. The PTC will need to account for a growing shift to Cloud-based services, and the resultant impacts that will have on operating costs (and the constraints on annual growth in operating budgets).
- **Security** – this is a fundamental long-range need, as threat vectors are constantly changing – the PTC must be prepared to adapt to them accordingly.
- **Social Media** –Google/Waze and Twitter feeds will be monitored along the turnpike and used to alert duty officers when an incident occurs. The rise of social media changes the PTC's relationship with its customers, provides new revenue-generating opportunities, and the ability to shape customer sentiment.
- **Operations Technology** – The PTC will soon have more devices connected to the internet than people. The more devices the PTC has on the roadway (e.g., sensors, DMS, and cameras, etc.), the more changes will be needed in security frameworks and in improved communications infrastructure. Emerging technologies will change the way the PTC makes business decisions and engages with its customers.
- **Big Data** – This can be used for predictive analysis to improve the PTC's public safety posture. While Big Data from Internet of Things devices will improve safety, it also provides the potential to change the way the PTC designs, builds, maintains, and operates the road. Over the next few years, it will drive machine learning and autonomous decision-making that will preclude human intervention.
- **Connected and Autonomous Vehicles** – As this technology advances, real time data will be able to be transmitted between vehicles, roadside units, and traffic management centers.
- **Fiber and Mesh Networks** – The PTC's communication bandwidth needs are continuing to increase. Installation of fiber along the turnpike will address the

bandwidth needs in the foreseeable future and replace the reliance on the microwave backbone. In addition to the fiber implementing a wireless mesh overlay along the entire length of the system will support connectivity to ITS devices, public safety radio, and future connected vehicle and connected infrastructure needs.

Fleet

The PTC maintains a fleet of equipment that consists of approximately 3,860 units, with an estimated value of $128.6 million. The fleet consists of equipment ranging from tractors and mowers for summer operations to dump trucks for winter operations to attenuators and arrow boards for safety. Safety Service Patrol vehicles are also used year round for customer safety and incident response. The majority of the fleet is oriented toward winter operations, and consists of the following types of equipment:

- One ton dump trucks
- Single axle dump trucks
- Tandem axle dump trucks with wing plows
- Snow plows / Tow plows
- Loaders
- Salt spreaders / Liquid dispensers



Chapter 7: Financial Analysis/ Scenarios

The challenges of funding a 552-mile network of roadway and its supporting infrastructure must be weighed against the constraints of available revenues and the commitments of funding obligations. **Act 44 of 2007** was passed by the Pennsylvania General Assembly in July of that year and dramatically altered the PTC's fiscal picture. The Act expanded the PTC's mandate from one focused entirely on constructing, operating, and improving the turnpike to one that also provides annual funding contributions for broader statewide transportation needs in highways, bridges, and public transportation. The Act's passage also assumed that Interstate 80 would be converted, maintained, and operated as a toll road. (In August 2007, the PTC applied to toll Interstate 80, but FHWA in April 2010 denied the application, citing legal concerns related to planned rent payments from the PTC to PennDOT. This decision resulted in a greater financial burden being placed on the PTC. With the FHWA decision, the PTC's annual payment obligations to PennDOT were reduced to $450 million.[15])

Despite this, since Act 44's passage, the PTC has fully met its obligations, and as of October 18, 2016, it has provided a total of $5.425 billion through payments under a Lease and Funding Agreement as amended in April 2014 with PennDOT.

The subsequent passage of **Act 89** in November 2013 reduced, but did not eliminate, the future burden of Act 44 payments by the PTC. The savings offered by Act 89 will not be realized for several years, but will be critical toward supporting the PTC's need for infrastructure preservation and improvement. Act 89 puts the PTC's final annual payment of $450 million at FY22, after which it will be reduced to $50 million beginning in FY23 through FY57. This annual payment of $50 million (in cash, not debt proceeds) will be used strictly to fund public transportation projects throughout Pennsylvania.

[15] The PTC would have paid $922 million to PennDOT in FY11 but that number would have continued to escalate at 2.5% annually if the PTC had received approval to toll I-80.

Act 44 Timeline

2007	2010	2013	2022	2057
General Assembly enacts Act 44, a year after the Transportation Funding & Reform Commission called for $1.7 billion in new revenue for Pennsylvania transportation.	Act 44 payments drop to $450 million, due to FHWA's decision not to approve the application to toll I-80.	General Assembly passes Act 89, which redirects funding to public transportation and reduces the Turnpike's annual obligation beginning in FY23.	Act 44 annual payments drop from $450 million to $50 million…a "sunset".	Act 44 expires – all PTC payments scheduled to end.

Over the course of the 2016-57 fiscal year periods, PTC debt issuance is expected to total $13.7 billion.

Table 8 depicts at a high level the major funding line items within the PTC's FY15 budget. The table also depicts the impact that the Act 44 payments and related debt service have on the PTC's ability to apply resources toward its capital needs.

Table 8: PTC FY15 Financial Highlights, Approximate Amounts

TOTAL EXPENDITURES		TOTAL REVENUES	
$1.9B		$2.1B	
EXPENDITURES		**REVENUES**	
Operating Expense	$350M	Total Operation Revenues	$950M
Debt Service	$430M		
Act 44 Payments	$450M		
Capital Expenditure	$640M	Bond Proceeds	$1.2B
TOTAL	**$1.9B**	**TOTAL**	**$2.1B**

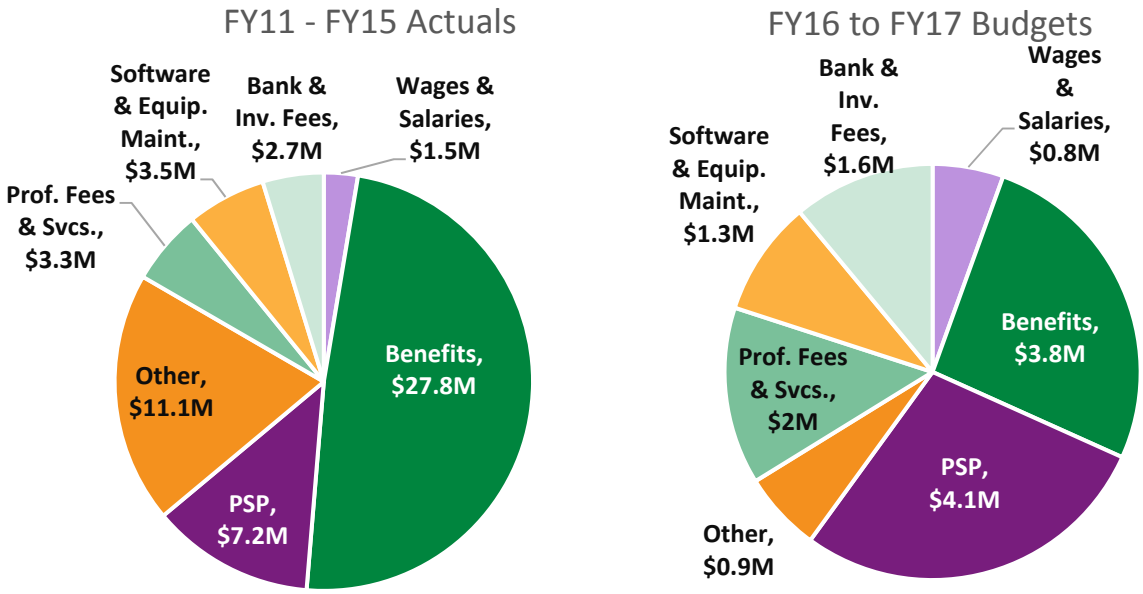
Source: PTC Finance Department

The line items within **Table 8** are further described in the following bullets.

The PTC's mandate under Act 44, as amended by Act 89, means the PTC will continue to have significant financial responsibilities to fund $450 million annually in public transportation projects through FY22.

- **Operating Costs** - The PTC is actively managing its operations to limit the rate of growth in operating costs directly under its control. However, it should be noted that significant portions of the PTC's operating budget are influenced by external factors. These external factors include the PTC's mandated contribution to the State Employees Retirement System (SERS), the PTC's contribution amount to the Pennsylvania State Police, and increased costs associated with third-party health benefits for PTC employees. Operating costs are expected to drop over time with the implementation of Cashless Tolling. **Figure 14** compares the PTC's historic and FY16 operating budgets, and demonstrates that the PTC is doing what it can to maintain increases in its operating costs at a rate under 4 percent.
- **Debt Service** – As noted in the table, FY16 debt service is approximately $430 million a year. This figure is projected to rise to $1 billion a year by FY25.
- **Act 44 Payments** – As of the adoption of this LRP, the PTC is obligated to pay PennDOT another $2.7 billion through FY22. These are resources that will not be able to be applied against PTC capital needs for a period well beyond the life of this long range plan. The PTC will continue to regularly access the capital markets to both finance its own capital needs and meet its Act 44 payment obligations. Between FY16 and FY25, the PTC is expected to issue $9.2 billion in debt (including issuance and reserve costs). Debt issued to support Turnpike capital needs over the next ten years is projected to be $6.1 billion, while debt issued to support Act 44 payment obligations is expected to be $3.1 billion during this period.
- **Capital Plan Expenditures** – The table indicates a current (FY16) annual figure of $640 million for Capital Plan expenditures. The proposed FY16 10-Year Capital Plan though entails an annual average of $673 million (YOE). The Capital Plan and most of the Act 44 payments (described below) are funded by debt issuance by the PTC.

Figure 14: Operating Budget Growth over Prior Fiscal Year



4-Year Total Growth - $57.1 million (Average Annual Growth = 4.8%)

1-Year Total Growth - $14.5 million (Average Growth = 4.0%)

Source: PTC Finance Department

While the PTC's long-range financial plan is based on reasonable financial assumptions, it is important to recognize that there are inherent uncertainties in projecting resources and obligations over a long-range time period, such as the life of the Act 89 obligation. Downside risks to the financial plan include lower than expected traffic and toll revenues, higher interest and inflation rates and/or greater than projected operating and/or capital cost increases.

To accommodate these risks, the PTC's financial plan requires it to maintain strong debt service coverage and preserve internal liquidity. Nevertheless, it is also important to assess how the combination of downside risks may impact the financial plan and to identify remediation measures the PTC could implement to maintain fiscal stability. PTC will monitor its performance relative to the financial plan, and take corrective action if costs are higher and/or toll revenues are less than projected. While such a scenario may call for further adjustments in toll rates, the PTC will need to explore strategies to contain cost growth or reprioritize capital investment initiatives to manage the level of toll rate adjustments and maintain fiscal stability.

In some areas of the state, the Turnpike could present a solution to a regional mobility problem, yet it does not have the financial capacity for programming and construction. This is reflected in the list of discretionary projects that appear at the end of this chapter. These include the proposed total reconstruction of the turnpike between Mid-County to Bensalem (MM 333-351). Projects such as these may be too large for the PTC to solve and finance on its own. Given the PTC's future funding picture, it will be necessary in some cases to rely less on the Capital Plan process, and more on regional funding partners – such as the state's MPOs – and other funding

mechanisms, such as public-private partnerships, and managed lanes. At a minimum, some projects will need to be deferred until after the partial sunset of Act 44 payments in FY22.

Capital Expenditures Forecast – Act 44 Financial Plan

The PTC has forecasted the amount of revenue that would be available for capital expenditure over the 20-year planning horizon of the Long Range Plan. Projected funds for the PTC's Capital Program are depicted in **Table 9** over various periods and annualized. These numbers constitute the maximum annual capital budget constraint, and were used as control totals against long-range capital needs across the PTC's various programs and categories through FY35. The amounts are supported by future toll rate increases on the Turnpike system, including anticipated 6 percent annual increases through FY20, then declining to 5 percent through 2025, then 4 percent in 2026, 3.5 percent in 2027, and 3 percent from 2028 through 2044.[16] The plan is thus constrained by a maximum of $15.1 billion in capital expenditures through the plan horizon of 2035 (or $11.7 billion in present value dollars, assuming 2.68 percent inflation).

Table 9: Average Annualized PTC Gross Operating Revenue and Capital Expenditure Forecast – Act 44 Financial Plan, FY16-35 (YOE, $m)

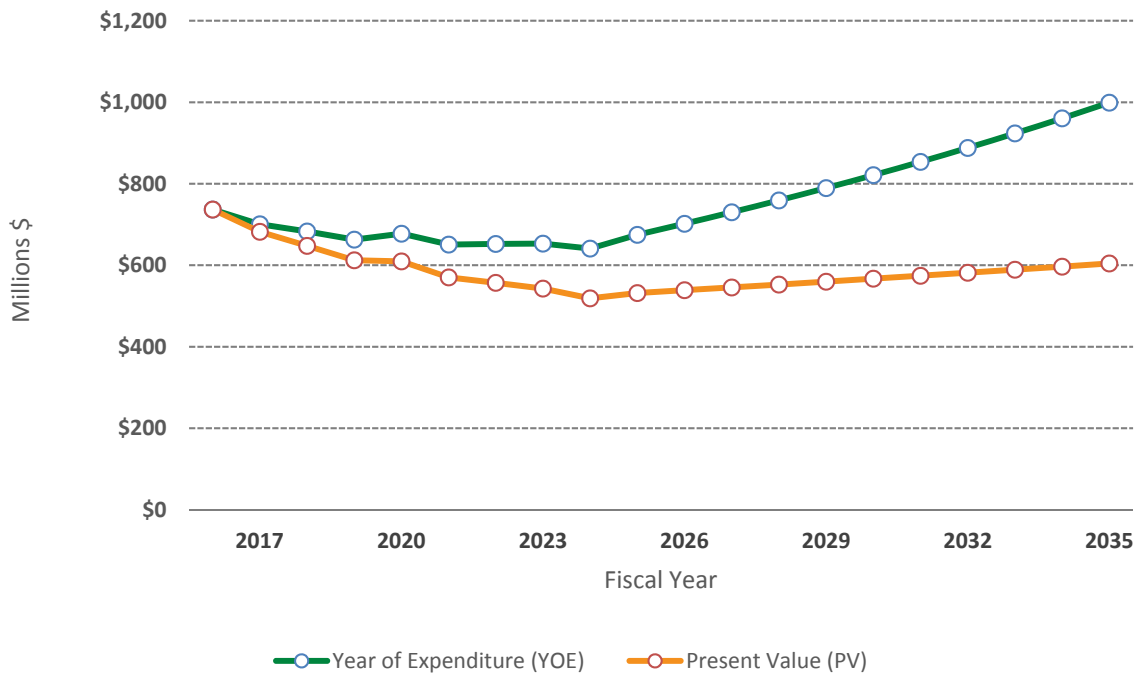
Dollars	FY16-20	FY21-25	FY26-35
Gross Operating Revenues	$1,198.9	$1,667.9	$2,419.1
Capital Expenditures	$630.0	$578.0	$738.0

Source: PTC Finance Department; Michael Baker analysis

[16] Assumed rates are for both cash and E-ZPass customers.

Figure 15 graphically shows anticipated funding available for capital expenditure over a 20-year period. The chart shows this value in both present value, and year of expenditure dollars assuming an inflation rate of 2.68 percent.

Figure 15: PTC Capital Expenditures – Act 44 Financial Plan, FY16-35



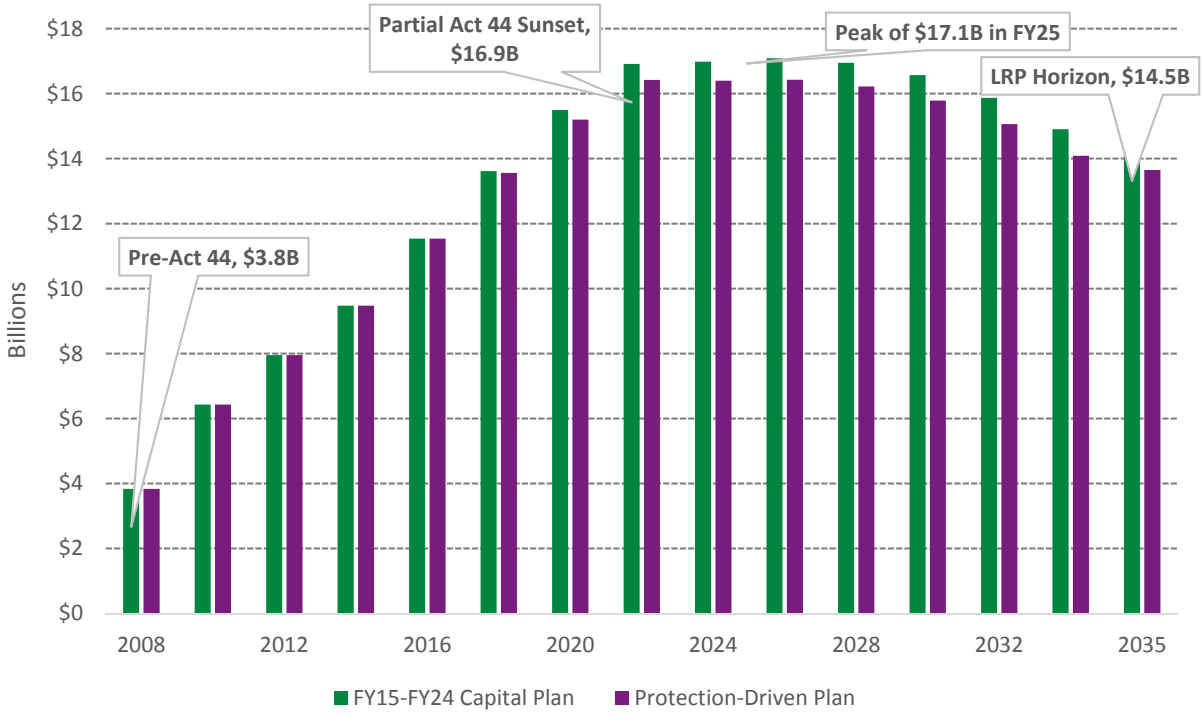
Source: PTC Finance Department

Defining a Protection-driven Scenario

From the financial analysis performed, it is apparent that the PTC cannot continue to sustain its Capital Plan at current funding levels. The PTC's annual revenue is just over $1.0 billion. This is applied against operating costs, Act 44 payments to PennDOT, debt service, and the capital program. As of the writing of this LRP, the PTC is $11 billion in debt. This figure is growing at a rate of nearly $1 billion a year, and by FY22, is expected to be approximately $16 billion. **Figure 16** provides more detailed information on the growth of the PTC's debt in the Act 44 era, based on the current proposed FY16 Capital Plan.

It is critical that the PTC balance its debt service with the condition of the system to maintain favorable bond ratings

Figure 16: PTC Debt Outstanding, FY08-FY35



Source: PTC Finance Department

The PTC's purpose for issuing debt is as follows:

- **Mainline Senior Debt** is issued for the purpose of financing the costs of various capital projects in the PTC's Capital Plan and for refunding outstanding Mainline Senior Debt.
- **Mainline Subordinate Debt** is issued for the purpose of financing a portion of the costs of making payments to PennDOT in accordance with Act 44 and Act 89 and for refunding outstanding Subordinate Debt.
- **Oil Company Franchise Tax Debt and Motor License Registration Fee Debt** are issued for the purpose of financing the costs of capital expenditures related to the Independently Funded Program and to refund outstanding Oil Company Franchise Tax Debt and Motor License Registration Fee Debt.

Other factors are also working against a robust capital program: Standard & Poor recently downgraded the PTC's Mainline Senior Bond rating from "A+" to "A" (**Table 10**). The net result of this action increases the cost of borrowing money. Further downgrades to the PTC's rating could compromise its ability to sustain operations. It is critical that the PTC balance its debt service with the condition of the system to maintain favorable bond ratings.

Table 10: Financial Status and Outlook: Senior Bond Investment Grade Ratings, 1998-2016

Period	Moody's	S&P	Fitch
1998-2007	Aa3	AA-	AA-
2008-2012	Aa3	A+ (2008)	A+ (2008)
2013-2016	A1 (2013)	A (2015)	A+

Source: PTC Finance Department

The PTC's financial burden is so significant, that not even major changes to tolling rates (beyond what is planned) would close the financial gap. Given these constraints, the PTC must begin taking steps to focus on what is within its control.

Chief among these include a reduction in the size of the capital program, as well as limiting or eliminating growth in portions of the operating budget. And while the PTC cannot control certain costs related to pensions, insurance, or the state police, it can limit the size of its complement and improve efficiencies with current staff.

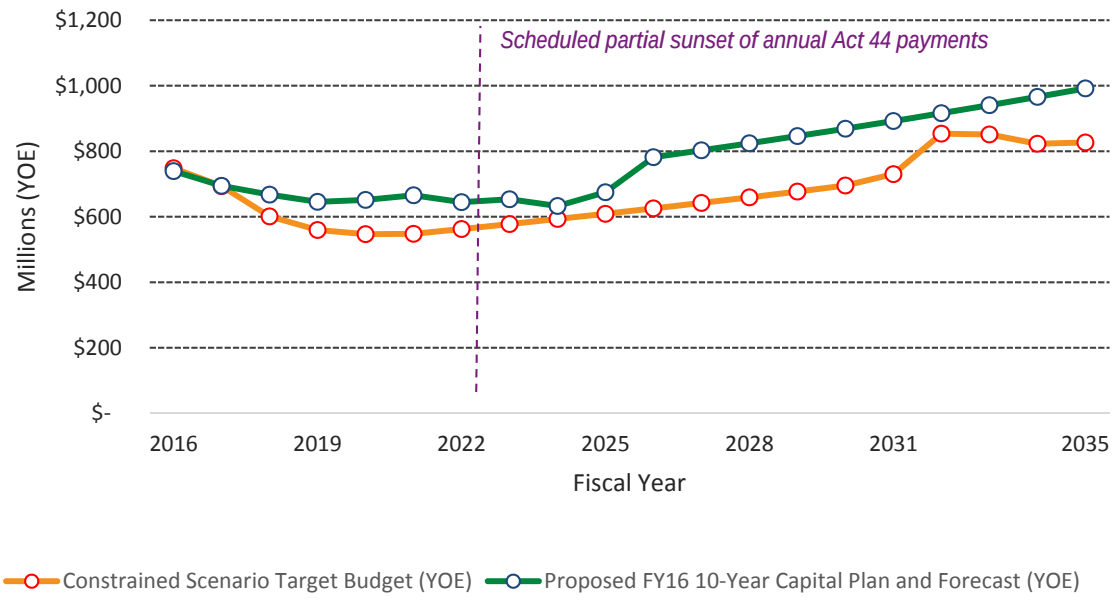
On the capital program side, a smaller capital program can be sustained, but must still be robust enough to be able to maintain the system at an acceptable operating condition while providing for mobility.

Such a program would constitute a "protection-driven scenario" – one that would see the Capital Plan moving toward a $480 million annual program by FY21, and maintaining that level of spending through FY30. This spending curve would average $520 million over the 20-year period, and is illustrated in **Figure 17**. Such a program would protect the PTC's assets, and keep them functioning in an acceptable operating condition. The cumulative reduction of this constrained capital program scenario over the 20-year period is calculated to be in excess of $1.56 billion (PV), or $2.1 billion (YOE).[17]

Such a scenario must be planned for to be able to balance the infrastructure needs of the system with managing its debt and associated bond ratings. If the PTC's bond ratings are downgraded further, it may be required to collateralize amounts due to some of the PTC's swap counterparties. Currently, those amounts are approaching $100 million. If this issue occurs, this event may add to the cost of future borrowing, and starve the Capital Plan of resources needed to meet infrastructure needs.

[17] PV refers to "present value," or values expressed in today's dollars, while YOE refers to "Year of Expenditure," which expresses value in today's dollars that include an annual inflationary factor of 2.68 percent.

Figure 17: Proposed Funding Levels (YOE): FY16 Capital Plan (and forecast) and Protection-driven Scenario



Source: Michael Baker International analysis

Scenario Planning

A key consideration to be addressed within this LRP update was "How large does the PTC's Capital Plan need to be, and what should each program's share be?" A critical element of this LRP update included an examination of the PTC's unconstrained capital needs. This analysis included the following elements:

How large does the PTC's Capital Plan need to be, and what should each program's share be?

- Needs were examined across all four of the PTC's Capital Plan functional areas, including: Highway, FEMO, Technology, and Fleet through FY35. In the case of the Highway Program, needs were examined for the categories within the program: Total Reconstruction, Roadway/Safety, Structures, Interchanges, and Highway Miscellaneous. Cashless Tolling was also examined, and is within the Interchanges category.
- Unconstrained needs were not "blue sky," but tied to the Infrastructure strategic driver contained within the PTC's Strategic Plan. (Thus, the unconstrained bridge needs were "constrained" by a supporting objective that states the PTC will "maintain the number and weighted percentage of structurally deficient bridges by deck area," etc.)
- Within the needs assessment, assumptions were made in developing a variety of potential outcomes. Future funding scenarios were broadly characterized as being "performance-driven," or "protection-driven." In most cases, the "performance-driven" scenario – as a more aggressive model – was more costly than the "protection-driven" approach. (These scenarios will be defined in greater detail within this chapter.)

- The analysis was completed using nominal or present value dollars (as opposed to year of expenditure) and amounts annualized for planning purposes.

Scenario Definitions

Performance-driven – includes projects necessary in meeting a LRP strategic driver goal and to maintain the longevity of the asset. Performance projects include new initiatives, and expansion of the current system.

Protection-driven – includes projects required to maintain the system at an acceptable operating condition while providing for mobility. It includes any project that is mandated or required due to regulations or compliance with PTC policies, recapitalization projects, and sustainment projects. It is NOT "maintenance only."

For analysis purposes, the PTC's traditional Capital Plan programs were recast as those that support "highway" needs as opposed to more ancillary, supporting elements. The highway components represent the PTC's core capital needs, and are also reflected within the proposed FY16 Capital Plan, where these elements entail 82 percent (YOE) of the entire plan. The remaining three programs (in addition to the Highway Miscellaneous Category) were treated as the "balance" of the program.

Also included within the analysis was a look at projects that are presently not included within the proposed FY16 Capital Plan but could become part of future performance-driven programs. These projects were tagged as "Parking Lot" items for future discussion and consideration.

The reorganization of the programs and categories for planning purposes is as depicted in **Table 11**.

Table 11: Reassignment of Capital Plan Elements for Analysis Purposes

Capital Plan Program/Category	Needs Grouping	Highway/Support
Total Reconstruction	Capacity	Highway
Roadway/Safety	Pavement	
Structures	Bridges	
	Tunnels	
Interchanges	Interchanges	
Cashless Tolling	Cashless Tolling	
Highway Miscellaneous	"Balance"	Support
Vertical Facilities		
Fleet/Maintenance		
Technology		
Discretionary Projects (i.e., new interchanges, full build-out of I-95, etc.)	"Parking Lot"	Highway

Table 12 depicts the results of the needs analysis, by needs grouping. The results are provided against a Performance-driven as well as a more conservative Protection-driven scenario, and compared to the funding levels within the proposed FY16 Capital Plan. The table indicates that unconstrained needs for the Turnpike System are approximately $1 billion a year, including several "parking lot" items that include several new interchanges – including a full build-out of the interchange with I-95 (stage 1 and stage 2). A "Protection-driven" scenario however, would entail a cut in spending on capital programs and consist of an overall annual capital plan of $520 million. Despite its more modest dimensions, this scenario would still allow for an average of nearly $40 million in spending annually for more "performance-driven" projects, such as the Scranton Beltway and the LaFayette Street Interchange. Spending on projects such as these equates to approximately 8 percent of the 10-Year Capital Plan, and ensures the PTC is continuing to invest in projects that meet their strategic goals and generate additional revenue.

Table 12: Annualized Needs through FY35, by Scenario and Proposed FY16 Capital Plan (PV)

	Performance-Driven ($m)	Protection-Driven ($m)	FY16 Capital Plan (PV $m)
Reconstruction (Capacity)	$600	$245	**$283**
Pavement (Surface)	$65	$75	**$68**
Bridges	$65	$45	**$78**
Tunnels	$40	$25	**$2.5**
Interchanges (Existing and Committed)	$45	$25	**$40**
Cashless Tolling	$20	$20	**$42**
SUBTOTAL	$835	$435	**$513.5**
Balance (Fleet; Tech; FEMO; Hwy. Misc.)	$165	$85	**$84**
"Parking Lot"	$85	$0	**n/a**
TOTAL	$1,085	$520	**$597.5**

Source: Michael Baker International analysis

A detailed summary of the analysis and assumptions behind the numbers presented above for the Highway-related needs groupings in **Table 12** are presented in **Appendix C – Long Range Plan Capital Needs Analysis**. This analysis was performed in arriving at a $520 average annual Capital Program.

"Balance" Line Items – These expenditures from **Table 12** refer to those that are ancillary to the roadway. These include the Fleet, Technology, and FEMO programs, as well as the Highway Miscellaneous Category. They are described in more detail below:

- **Highway Miscellaneous**[18] – This LRP assumes that the share of this category will remain at 5 percent of the Highway Program over the next 20 years. For the proposed FY16 Capital Plan, this amount averages $27 million a year. For the constrained scenario, the number is $22 million.
- **Technology –** For planning purposes, annual costs related to this program as part of the Protection-driven scenario were expected to average $17 million a year.
- **FEMO** – Average annual costs related to this program under the Protection-driven scenario are $31 million.

Fleet/Maintenance – As this LRP was being updated, the PTC was also administering a fleet/equipment management program intended to assess fleet utilization and specifications, as well as long-term needs. Actual numbers for this program were not available for analysis during the LRP update process, but will be incorporated by reference. The Protection-driven scenario includes an average annual cost of $16 million for Fleet/Maintenance, compared to the proposed FY16 Capital Plan amount of $17 million.

The "Parking Lot" – This line item includes high-cost projects that would be included in a Performance-driven scenario. The PTC has received requests for constructing eight additional interchanges. These include: three in Montgomery County; two as part of the proposed Scranton Beltway project; one in the Greater Carlisle area, one at PA 743 near Hershey, and one at PA 981 in Westmoreland County. Funding all of these proposed interchange projects through FY35 is estimated to cost $400 million, or an annualized total of $20 million over the 20-year LRP.

Also included within the Parking Lot was a multi-phased project involving the PTC's interchange with Interstate 95. This is a significant capital project that will include the construction of a direct interchange between the two interstates, including a new mainline toll plaza and a cashless tolling plaza (westbound). Stage 1 is currently funded and under construction. Remaining phases will include the completion of the reconstruction and widening of the remaining interchange connectors, as well as the reconstruction of the Delaware River Bridge. Funding for the remaining phases is estimated to cost $1.3 billion, or an annualized cost of $65 million over the 20-year LRP.

The analysis as documented in **Table 12** illustrates that differences between a Performance-driven versus a Protection-driven scenario are marginal for most of the needs groupings, when compared to the Turnpike's reconstruction needs.

The following series of charts (**Figure 18, Figure 19, Figure 20,** and **Figure 21**) compare the two scenarios further against the proposed FY16 Capital Plan, as well as 10-year historic actual program shares (FY06-15) for the four program areas, as well as for the Highway Program, specifically.

[18] This traditionally entails approximately 5 percent of the Highway Program, and includes activities related to ITS, tree clearing, rock cuts/geotech projects, signs and pavement markings, drainage/stormwater, and traffic operations/studies.

Figure 18: 10-Year Historic Actuals, FY06-FY15 (PV)

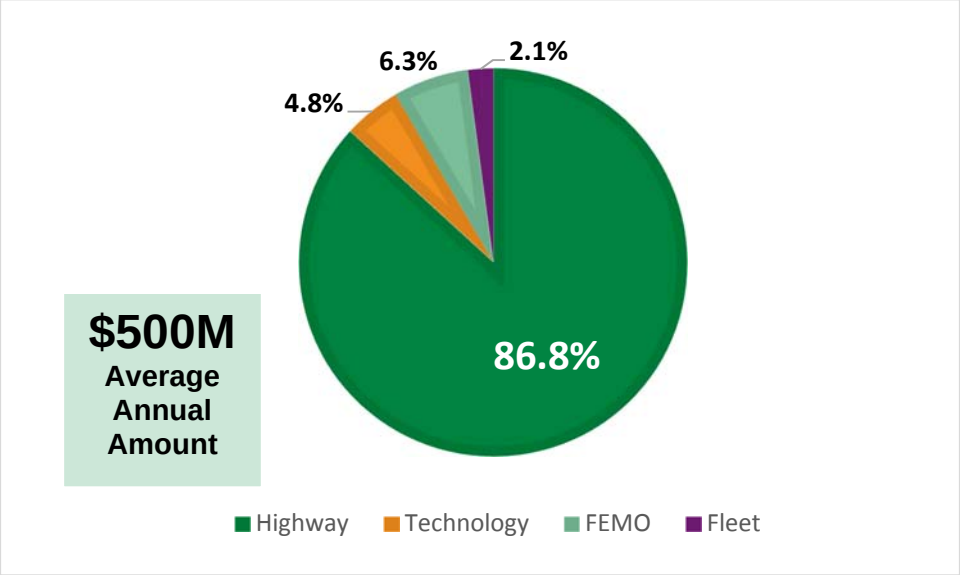


Figure 19: FY16 Capital Plan and Highway Program Breakout (YOE)

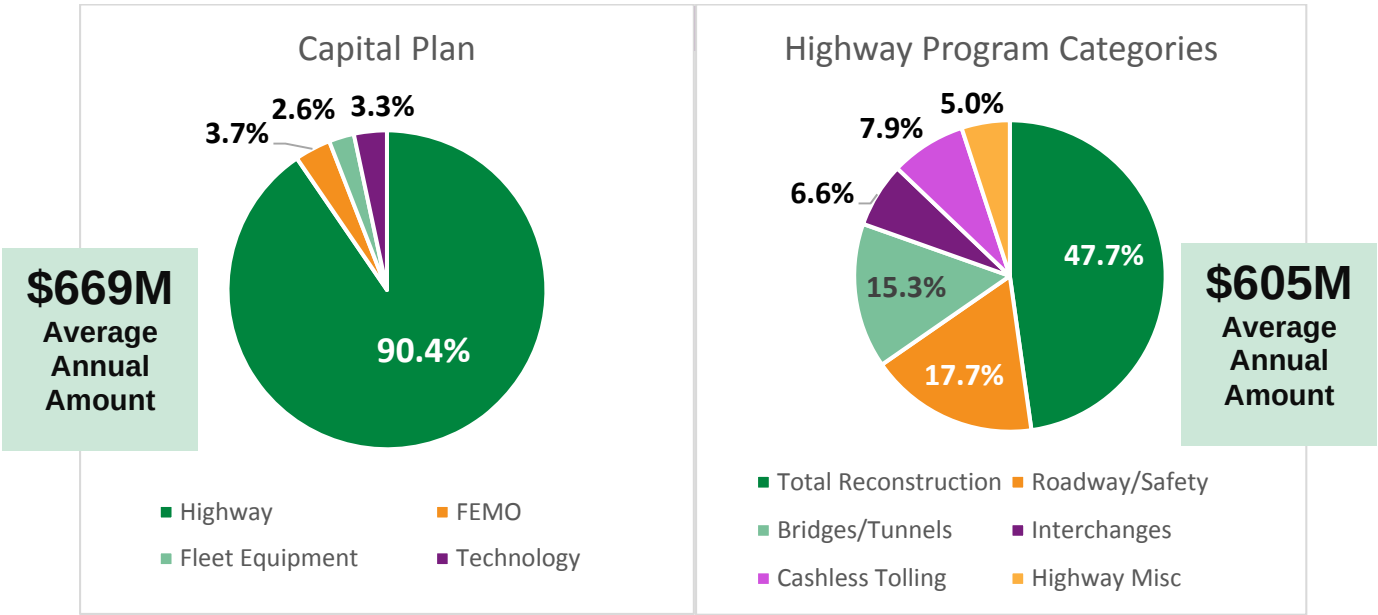


Figure 20: 20-Year Performance-Driven Scenario, Capital Plan and Highway Program Breakout, FY16-35 (YOE)

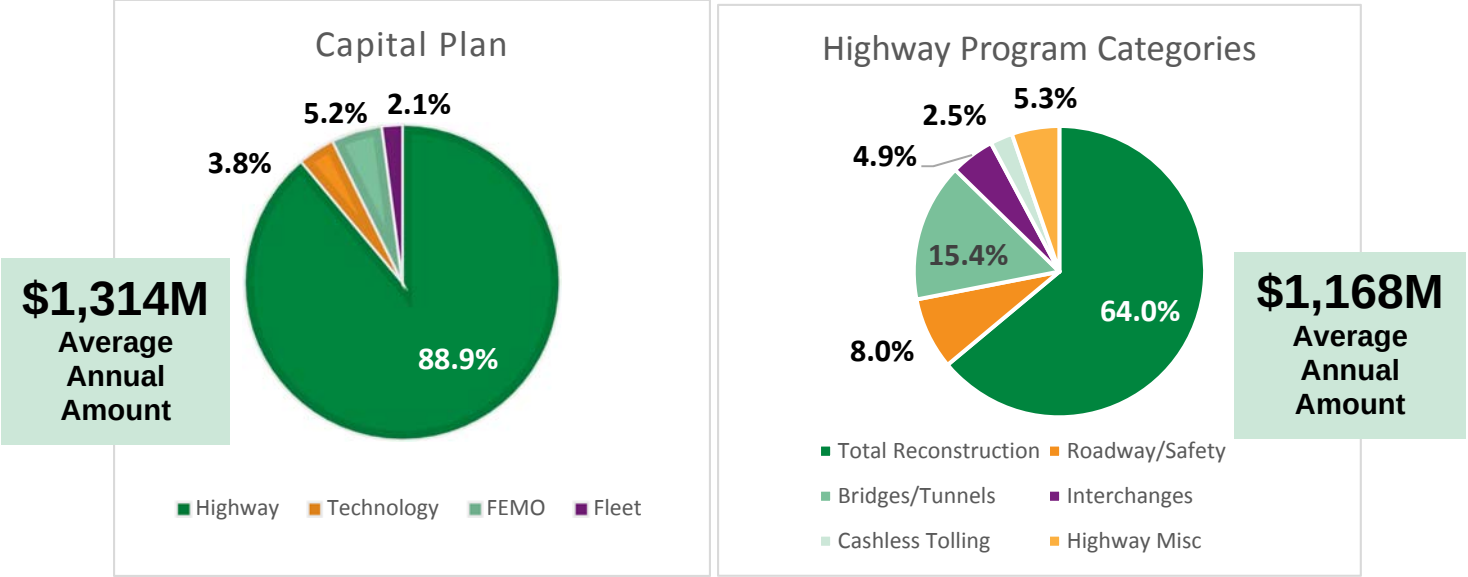
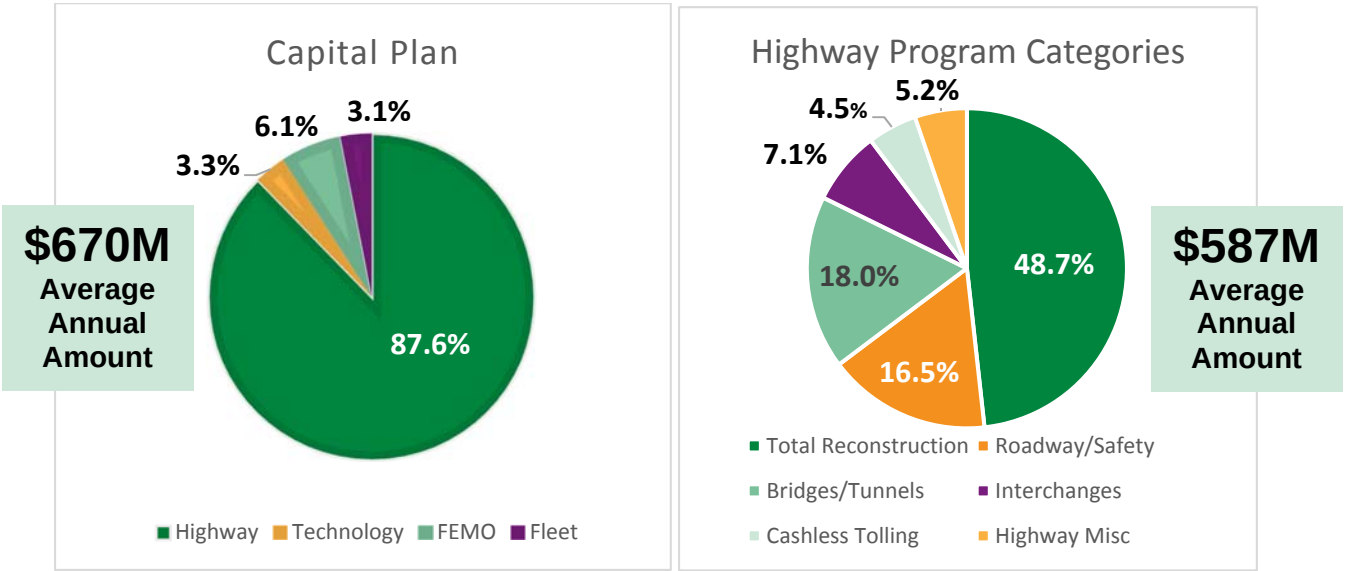


Figure 21: 20-Year Protection-Driven Scenario, Capital Plan and Highway Program Breakout, FY16-35 (YOE)



The following figure outlines in more specific detail how each category within the Highway Program would be affected by moving to a Protection-driven Scenario.

Figure 22: Comparing the Protection-driven Scenario to the Proposed FY16 Capital Plan

HIGHWAY PROGRAM

Roadway/Safety Category

- Funding would decrease from an annual average of $95M/yr to $75M/yr
- Rehabilitation of the Northeast Extension between A75 and A131 would be delayed beyond the 20-year Long Range Plan
- Assumes 50 miles of resurfacing per year and no change in safety projects

Bridge, Tunnels & Misc. Structure Category

- Overall funding would decrease from an annual average of $81M/yr to $80M/yr
- Bridge portion of the funding would decrease from $78M/yr to $55M/yr
    - Maintains the current SD rate of 4% based on GHD model (may expect slight increase in SD rates, over time)
- Tunnel portion of the funding would increase from $3M/yr to $25M/yr
    - Includes major tunnel rehabs
    - Does not include Allegheny Tunnel bypass

Total Reconstruction Category

- Funding would decrease from an annual average of $256M/yr to $220M/yr
- Most projects on the program will be delayed by 1 to 5 years
- Projects delayed beyond the Act 44 sun setting include:
    - MP A38 to A43
    - MP A43 to A44 Quakertown interchange
    - MP 57 to 62
    - MP 316 to 319
    - MP 320 to 326
- Does not include Mid-County to Bensalem
- Completion of the total recon program would take 4 years longer than proposed FY16 Capital Plan:
    - At the current pace of design (9 mi/yr) – 2046
    - At the proposed FY16 Capital Plan funding pace - (8 mi/yr) – 2050
    - At the “protection” pace (7 mi/yr) – 2054

Interchange Category

- Not including I-95 Stage 1, funding would increase from an annual average of $7M/yr to $18M/yr
  - Funding does not include Stage 2 and 3 of the I-95 project
  - Funding does include LaFayette Street Interchange
  - Funding includes 5 major rehabilitation interchange projects (proposed FY16 Capital Plan does not include any)

Cashless Tolling

- Funding would remain unchanged, spread out over 20 years versus 10 years
- Cashless Tolling in-place would be delayed by three years (completion in 2022)
- Mainline Cashless Tolling would be delayed several years (completion in 2026)

Highway Miscellaneous Category

- Funding would decrease from an annual average of $27M/yr to $24M/yr
- Traffic engineering and operation projects (ITS, ATMS, etc.) could be delayed

FLEET AND TECHNOLOGY PROGRAMS

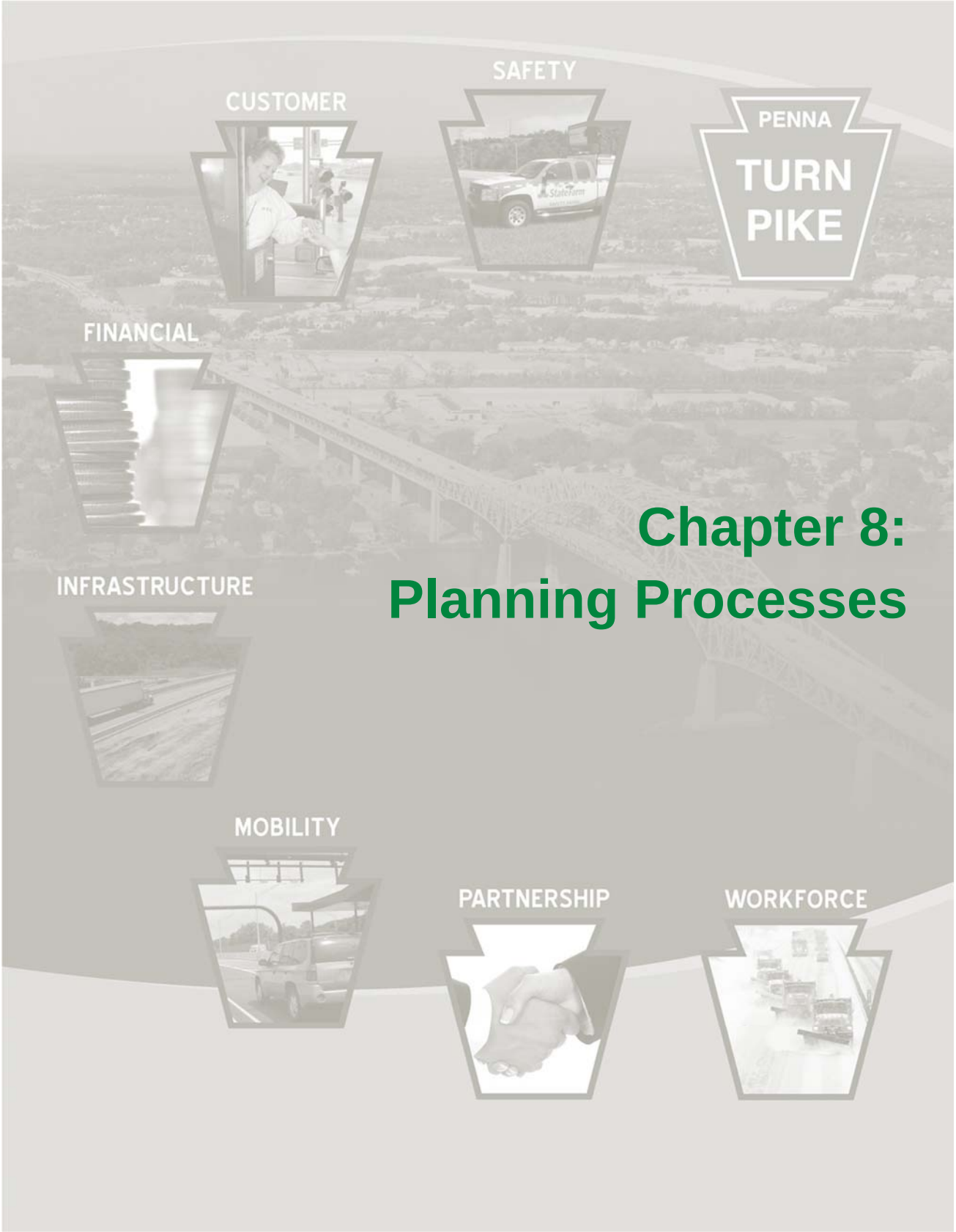
- Funding would remain relatively unchanged from the FY16 Capital Plan 10-year average on a percentage basis
- Funding does not include the $200M fiber optic project under the Technology Program
- Funding assumes the reduction of PTC pool vehicles

FEMO

- Funding would increase from an annual average of $23M/yr to $31M/yr
- Increase allows for the replacement of 5 maintenance sheds with poor condition ratings

“PARKING LOT” ITEMS

- Northeast Extension Rehabilitation
- Allegheny Tunnel Bypass
- Mid-County to Bensalem
- I-95 Stage 2 and 3
- New access points (8) systemwide



Chapter 8: Planning Processes

This section provides a brief overview of what new tools and methods will be available going forward by category and/or program area.

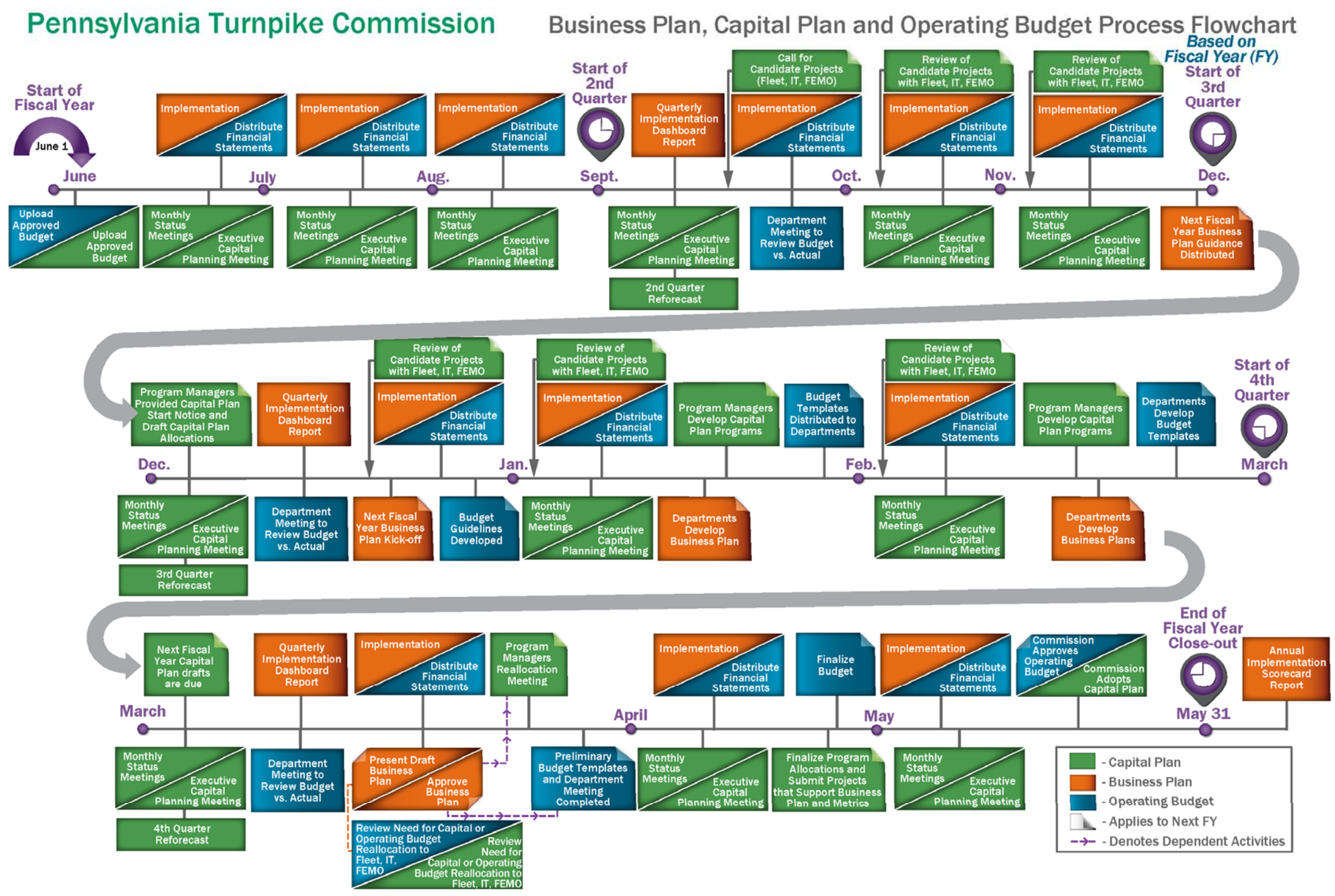
Capital Plan, Operating Budget, and Business Plans

Developing and monitoring the aspects of the Capital Plan, operating budget and business plans is a year-round effort, with continual focus on key Strategic Measures.

The PTC Capital Plan spans 10 years and is reviewed and adopted by the Commissioners on an annual basis. When adopted the Commissioners approve procurement of long lead equipment and advertising for the use of consultants, contractors and other necessary professional services to advance all phases of project within the first two years of the plan. Adoption of the Capital Plan usually occurs in May of each year prior to the start of the new fiscal year. The PTC Operating Budget is approved by the Commissioners on an annual basis. The Finance Department works with the individual departments and coordinates the Operating Budget process. The Planning Unit in the Engineering Department coordinates the development of department Business Plans. Annually, Business Plans are developed by each department for review and acceptance by PTC Executive staff.

The PTC's fiscal year begins on June 1st and ends on May 31st. The implementation and execution of the Capital Plan, Operating Budget, and Business Plans is an ongoing and closely managed effort. Each month PTC executive staff receives financial statements for each department's operating budget. They also receive weekly capital plan spending reports and hold monthly meetings to evaluate and update the status of the Capital Plan. Each department tracks the progress of their business plan objectives, tactical initiatives and metrics. Departments review the status of their business plans with the Planning Unit on a quarterly basis for the development of the Quarterly Implementation Dashboard Report. **Figure 23** illustrates the process flow and inter-relationship of the Capital Plan, Operating Budget, and Business Plans.

Figure 23: Capital Plan Process Flowchart



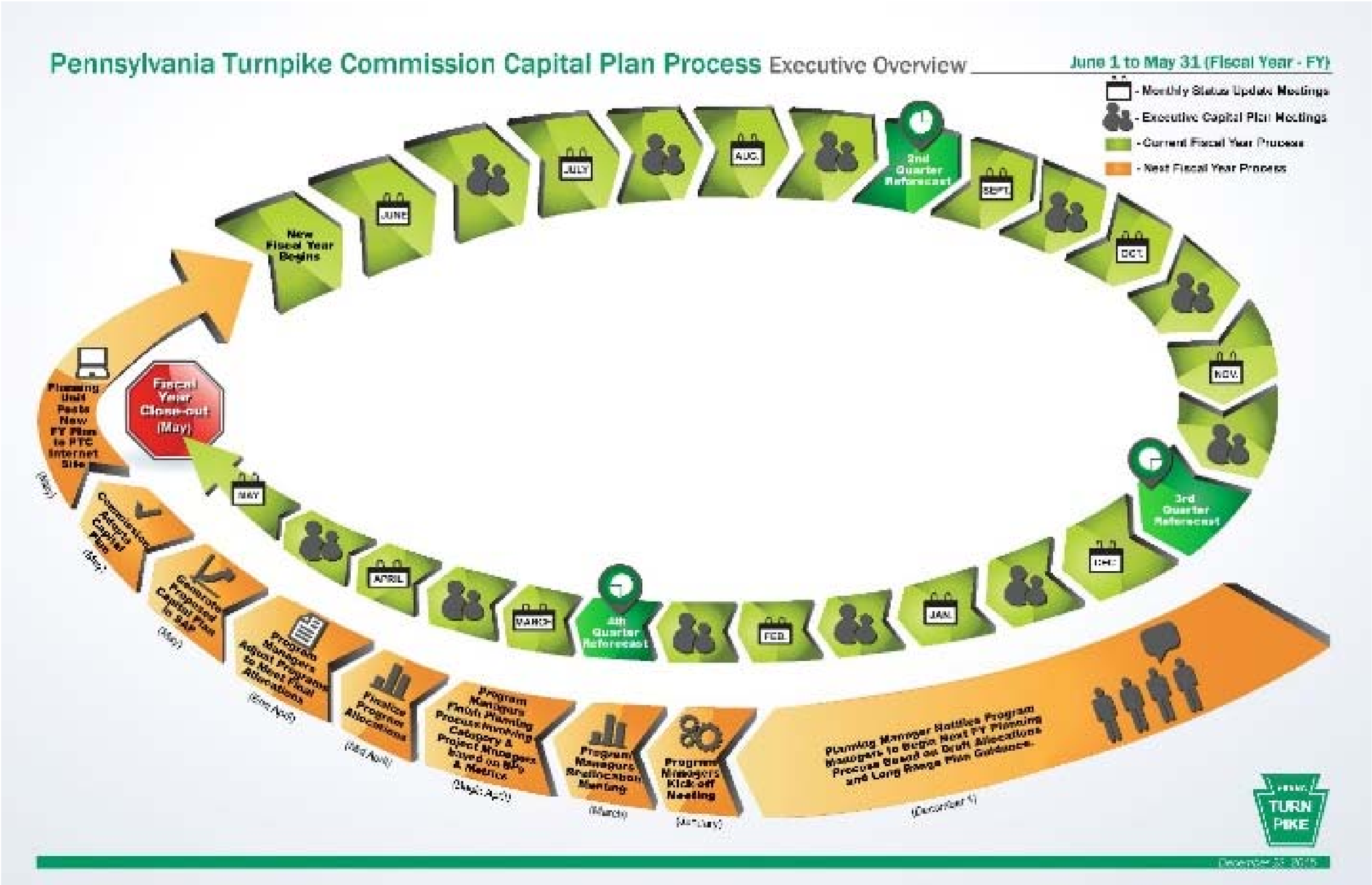
Intentionally blank

Shortly after the end of the third quarter, several more detailed and focused reviews of the Capital Plan, operating Budget and business plans are completed for preparation for the next fiscal year. A meeting is held between staff from the finance department and each department to review their operating budget actual expenditures versus budgeted. The Capital Plan is reforecast quarterly to account for items such as estimated project cost changes, adjustments in construction drawdown schedules, construction work orders, or changes in the project availability to bid. Executive staff also receives a quarterly business plan implementation dashboard report that summarizes the progress towards achieving key objectives and metrics. An annual implementation scorecard report is issued at the end of the fiscal year that summarizes the efforts for the entire fiscal year. As of the writing of the LRP, executive staff has requested that the business plan process go from a one year cycle to a two year cycle. The Planning Unit is currently working on the new biannual process.

For a project to be listed on the adopted Capital Plan it first needs to go through the capital plan process. The capital plan process begins about a year before the capital plan is adopted by the Commissioners. The PTC Capital Plan has four programs and each Program Manager is responsible for the development and prioritization of projects in their program. **Figure 24** illustrates the Capital Plan process.

Intentionally blank

Figure 24: PTC Capital Plan Process



Intentionally blank

1st Quarter (June-August)
The Planning Unit schedules and holds monthly Capital Plan status meetings with the program managers to compare dollars for their projects spent to date to the dollars that were allocated in the Capital Plan for their projects up to that month. In addition, monthly Executive Capital Plan meetings are held to discuss issues delivering the Capital Plan (including procurement issues), operating budgets, administrative items and close out of projects.

At the end of the 1st Quarter, the Planning Unit provides reforecast instructions and information to the program managers with the actual money spent for projects through the first quarter of the FY and the program managers need to review the data supplied on money spent versus the adopted FY Capital Plan values associated with their projects. The program managers will reforecast their planned project expenditures through the end of the fiscal year. Each program manager should obtain current status information from their category managers, project managers and other internal customers.

2nd Quarter (September-November)
The 2nd Quarter begins with a call for candidate projects for the next fiscal year for the Technology, FEMO, and Fleet Equipment Programs. These programs provide overall support to all of the PTC departments, and benefit by having early coordination on candidate projects. The guidance for the next fiscal year's business plan is developed and distributed at the end of the 2nd Quarter.

At the end of the 2nd Quarter, the Planning Unit provides reforecast instructions and information to the program managers with the actual money spent for projects through the second quarter of the FY and the program managers need to review the data supplied on money spent versus the adopted FY Capital Plan values associated with their projects. The program managers will reforecast their planned project expenditures through the end of the fiscal year. Each program manager should obtain current status information from their category managers, project managers and other internal customers.

Monthly Capital Plan status meetings & Executive Capital Plan meetings continue throughout the second quarter.

3rd Quarter (December-February)
The 3rd Quarter begins with the Planning Unit providing the Program Managers with the draft Capital Plan allocations and instructions regarding the development of the next fiscal year Capital Plan. The candidate Capital Plan projects will be developed in consideration of strategic and business plan goals. The 3rd Quarter also includes the development of the draft Capital Plan allocations based the current values from the approved Capital Plan. The 3rd Quarter also includes a business plan kick-off meeting and the development of the department's draft business plans. Collaboration will continue with any support group involved, but particularly Technology, FEMO, and Fleet Equipment programs. The Finance department distributes the operating budget templates to the Departments and they begin drafting their operating budget templates for the next fiscal year.

At the end of the 3rd Quarter, the Planning Unit provides reforecast instructions and information to the program managers with the actual money spent for projects through the third quarter of the FY and the program managers need to review the data supplied on money spent versus the adopted FY Capital Plan values associated with their projects. The program managers will reforecast their planned project expenditures through the end of the fiscal year. Each program manager should obtain current status information from their category managers, project managers and other internal customers.

Monthly Capital Plan status meetings & Executive Capital Plan meetings continue throughout the third quarter.

4th Quarter (March-May)
The 4th Quarter (March-May) is the culmination of the planning for the next fiscal year. In March the draft department business plans will be presented and discussed with the executive staff. The approval of the business plans will initiate a prompt review and potentially a readjustment of the Capital Plan allocations and/or the department operating budgets. These adjustments are completed in April, which is the month when the PTC finalizes its operating budget, and the Capital Plan program allocations and projects. The PTC approves the operating budget and adopts the Capital Plan in May. At the end of the quarter, the Planning Unit works with the Program Managers to close-out projects that have been completed during the current fiscal year.

Once the capital plan is adopted, the Planning Unit follows internal department procedures and uploads the adopted plan into the PTC's SAP system. The Planning Unit is responsible to provide the new FY Capital Plan to be posted on the PTC internet site.

Monthly Capital Plan status update meetings & executive Capital Plan meetings continue throughout this final quarter.

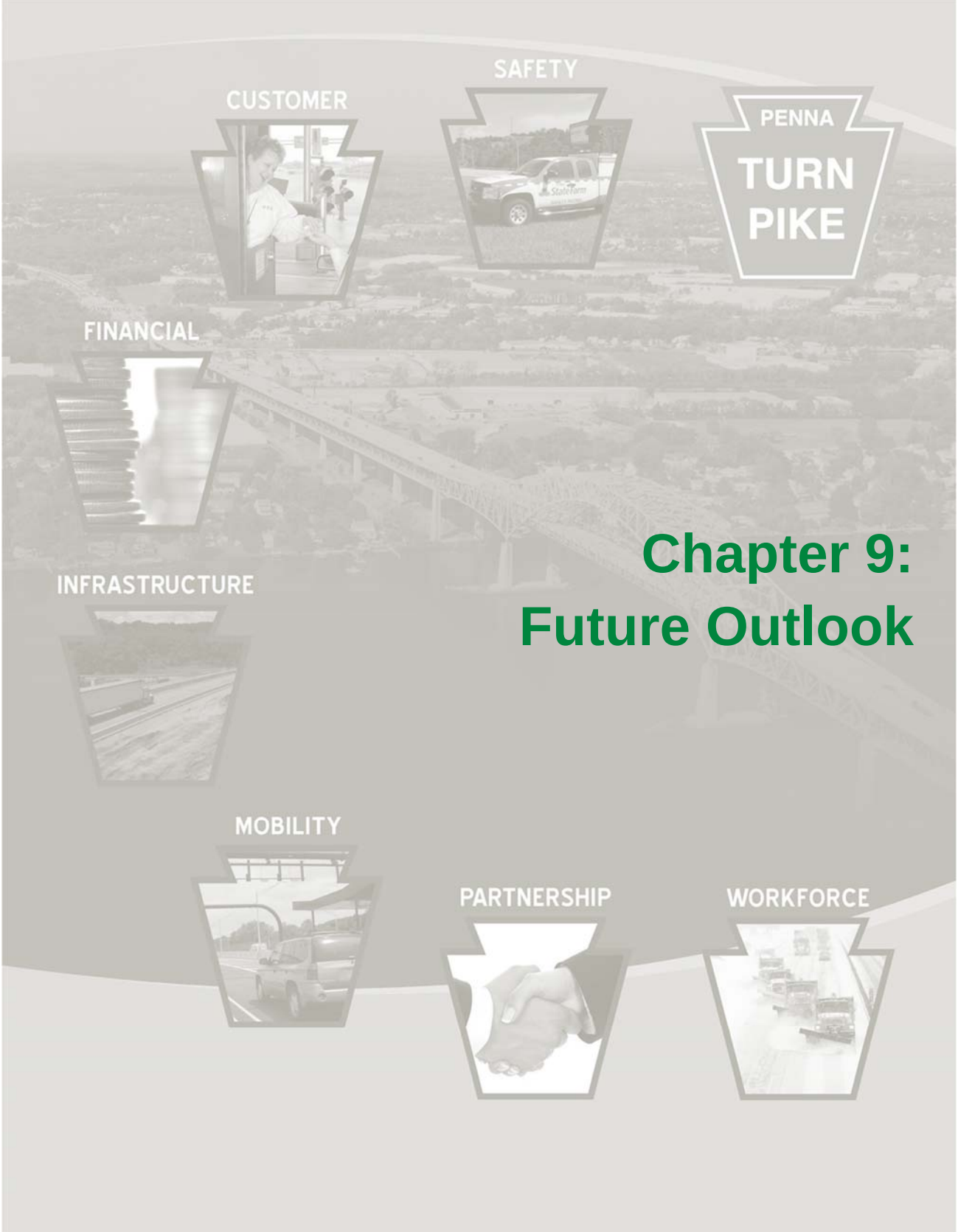
Project Prioritization

At the PTC, prioritizing projects as a process within the development of the Capital Plan has matured over time. Each of the highway category areas administer an analytical framework from which candidate projects are considered and evaluated. The process is carried out in each discrete category area in specific ways, yet all consider the objectives and measures that have been developed in support of the PTC's seven strategic drivers. Projects are considered within each program area as follows:

- **Highway Program** - Proposed projects are weighed against specific measures, namely, the number and weighted percentage of structurally deficient bridges (by deck area); and maintaining "Good" Pavement Condition Ratings (PCR) of 80 or better and a minimum PCR of 65 for any roadway section or other approved pavement condition measure. All of the Highway Program projects contained within the Capital Plan are directly related to the PTC's strategic drivers.
- **FEMO Program** - Measures under the PTC's strategic driver for infrastructure advocate for the PTC to maintain facilities in a "Good" state of repair and to maintain a life cycle

approach. The PTC measures the performance of its facilities (e.g., maintenance buildings, stockpiles, toll plazas, etc.) against the standards of the Facility Condition Index (FCI). The FCI rating system is used to provide a benchmark in comparing the relative condition of a group of facilities. Spending for this program area addresses the strategic driver related to Infrastructure.

- **Fleet Equipment Program** - Equipment purchases are based on the life cycle replacement needs for the PTC fleet. The PTC recently administered a fleet equipment management project, which examined fleet utilization and specifications. The program historically addresses three primary strategic drivers: Safety, Customer, and Infrastructure.
- **Technology Program** - It is important to the efficient operation of the PTC that technical standards pertaining to the planning of technology resources are developed and governed by policy. The PTC has created an IT governance process for developing technical standards and procedures governing all IT/OT investments within the organization in support of an enterprise approach. The intent is to maximize the value of the PTC's technology investments, ensure technical interoperability, produce information security, and reduce functional duplication. The Technology Program supports several of the PTC's strategic drivers, including: Safety, Customer, Infrastructure, Financial, Mobility, and Workforce.



Chapter 9: Future Outlook

Background/Overview

Part of the PTC's vision includes maintaining its role as "the world's finest superhighway." The PTC has a celebrated history of transportation innovation and excellence. In order to maintain its status as the world's finest superhighway, it is important for the PTC's planning products and processes to be able to continuously provide information that improves its planning, programming, and decision-making. Good decisions cannot be made without good data. The PTC's portfolio of plans and planning processes (e.g., capital plans, business plans, long range plans, etc.) all serve to help the PTC achieve its vision through the institution of policies, projects, and programs that are in alignment with the organization's strategic drivers.

But what of the future? What actions will the PTC need to take to remain a step ahead? The role and application of technology to the PTC figures to remain an important element in "staying ahead." Just as society has greatly benefitted from an explosion in communication technologies, so too is the transportation industry poised to benefit from technological developments just on the horizon that promise greater efficiencies in how transportation services are administered.

There are several technological initiatives that the PTC is pursuing in order to better fulfill its leadership within the transportation industry, as well as its public responsibilities to provide a safe, sustainable, and uninterrupted travel experience. For example, previous sections of the LRP provide a compelling rationale as to why the PTC must move toward a Capital Plan of more modest dimensions. This approach defers large projects (such as the Allegheny Tunnel bypass) and moves forward on innovative initiatives such as Cashless Tolling. As financial resources become scarcer, the premium for traffic operations and the introduction of more analytical and technological solutions to the PTC's existing challenges will continue to grow. A few of these related initiatives now underway are discussed within this chapter of the LRP.

Technological Initiatives: Staying Ahead

The PTC is advancing the development and deployment of an $18.3 million **Next Generation Operational Environment (NGOE)** for the PTC's Traffic Operations Center (TOC). Upon implementation, the proposed NGOE will control all existing and future Intelligent Transportation System (ITS) devices, data, and subsystems that serve as the backbone of traffic operations, incident response, work zone management, weather management, and traveler notification. The project will revolutionize the transmission of critical real-time roadway data to the TOC to strengthen incident management and improve safety throughout the PTC's roadway network.

In addition, the project will deploy connected vehicle technologies on the PTC's fleet to capture and share real-time data on work zones, incidents, safety, and weather, and will provide for the direct integration of crowd-sourced incident information to enhance situational awareness and traveler information. Direct integration of event data and sharing of real-time ITS device status will enhance response and coordination activities with PennDOT.

The project will include social media and crowdsourced integration as well as the planning, design, procurement, and installation of connected fleet technology. Ongoing partnerships with

Waze, Twitter, and other social media platforms will enable the PTC to leverage data sharing partnerships to augment real time traffic reports.

Integrating crowdsourced incident information will further enable the PTC to reduce incident detection and response time. The project will also connect the PTC vehicle fleet with leading-edge connected vehicle innovation. PTC's Connected Vehicle Roadmap project will establish the concept of operations for work zone, incident management, safety, and weather related applications. A connected vehicle technology will be deployed on over 1,000 PTC-maintained vehicles.

The NGOE project is part of a multi-year planning effort underway by the PTC to review the TOC and prioritize planned operational improvements over the next decade. As an extension of continued modernization, this project will implement technologies to replace an obsolete operating system that no longer meets PTC system performance requirements, and will emphasize state-of-the-art communications and data sharing to dramatically enhance the PTC's ability to communicate efficiently and effectively with travelers to improve safety and improve mobility.

Connected and autonomous vehicles have the potential to be game changers, particularly when it comes to safety and making zero fatalities a reality. The PTC is preparing for the eventuality of the mainstreaming of these technologies. First, PTC representatives are currently participating in an Autonomous Vehicle Policy Task Force led by PennDOT as it seeks to develop a statewide policy for the safe testing and operation of these vehicles on Pennsylvania roadways. A draft policy is expected by November 2016. In addition as mentioned previously, the PTC is in the midst of the development of a Connected Vehicle Roadmap. To aid in its development, the PTC has formed a working group which includes PennDOT, MPO's, FHWA, and Carnegie Mellon University (CMU), among others. Finally, it is anticipated the PTC will participate in a statewide effort to prepare a Connected/Autonomous Vehicle Strategic Plan for Pennsylvania, anticipated to be started in late 2016 / early 2017.

The PTC is also moving forward to install **fiber optic cable** with wireless mesh overlay along the 550-mile extent of the turnpike. The project would provide improved communication capacity for the PTC as well as PennDOT, while a private partner would market and lease the remaining capacity. Such an arrangement would support the PTC's core business needs, including tolling data and traffic operations support, including connected vehicle technology. A P3 approach to the implementation of this project allows the PTC to focus on its core business as an operator of a toll roadway while simultaneously being able to market available excess capacity. It represents the PTC's first use of this innovative method of procurement.

The PTC is involved in other areas as well. In the arena of **Geographic Information Systems (GIS)**, the PTC is looking to create an enterprise data repository that is geospatially enabled and can be used for visualization, analysis, and reporting purposes in any of the PTC's GIS environments. One output of this data would allow the user to be able to manage the PTC's centerline and right-of-way feature classes so that multiple, date-stamped versions of these feature classes are available to PTC departments and changes can be visualized and analyzed

over time. An enterprise-wide GIS gives the PTC another important “tool in the toolbox” for its long range planning efforts.

Asset management practices continue to be advanced at the PTC. Appendix E of the LRP describes the deterioration analysis that was performed on the PTC’s bridge and pavement assets. As asset management capabilities develop, it will enable the PTC to be able to make better cost-effective decisions regarding the allocation of resources and management of its infrastructure.

And finally, mentioned earlier in the LRP, the PTC has already begun a staged implementation of **Cashless Tolling**. The opening of the first highway-speed, cashless tolling point on the mainline at the Delaware River Bridge in January 2016 has heralded the beginning of a new era in the management of the PTC’s non-stop travel system.

The initiatives described in this chapter are not exhaustive, but do provide an illustrative overview of just a few of the initiatives that PTC leadership is taking to advance the agency’s position as a leader within the industry. Many of these initiatives and their plan for implementation are described in more detail in the PTC’s Traffic Operations Plan (TOP). Not coincidentally, all of these initiatives are supportive of and reinforce the PTC’s seven strategic drivers (Safety, Customer, Financial, Infrastructure, Mobility, Partnership, and Workforce) that are highlighted and discussed in the opening chapter of the LRP. These and other projects and initiatives like them will be needed in order for the PTC to achieve its vision:

In serving our customers, we will reaffirm ourselves as the world’s finest superhighway by:

- Fulfilling our public responsibility to provide a safe, sustainable, uninterrupted travel experience.
- Becoming an industry leader, a valued business partner, and a trusted employer.

The Way Forward: LRP Recommendations

The Long Range Plan advances several recommendations:

Maintain an emphasis on safety – Safety should continue as the prevailing narrative in all of the PTC’s programs for their employees, customers, and work zones. This includes elevating the safety culture at the PTC, preventing injuries, and reducing workers’ compensation costs, as the PTC continues its aspirational journey on the Bridge to Zero Fatalities.

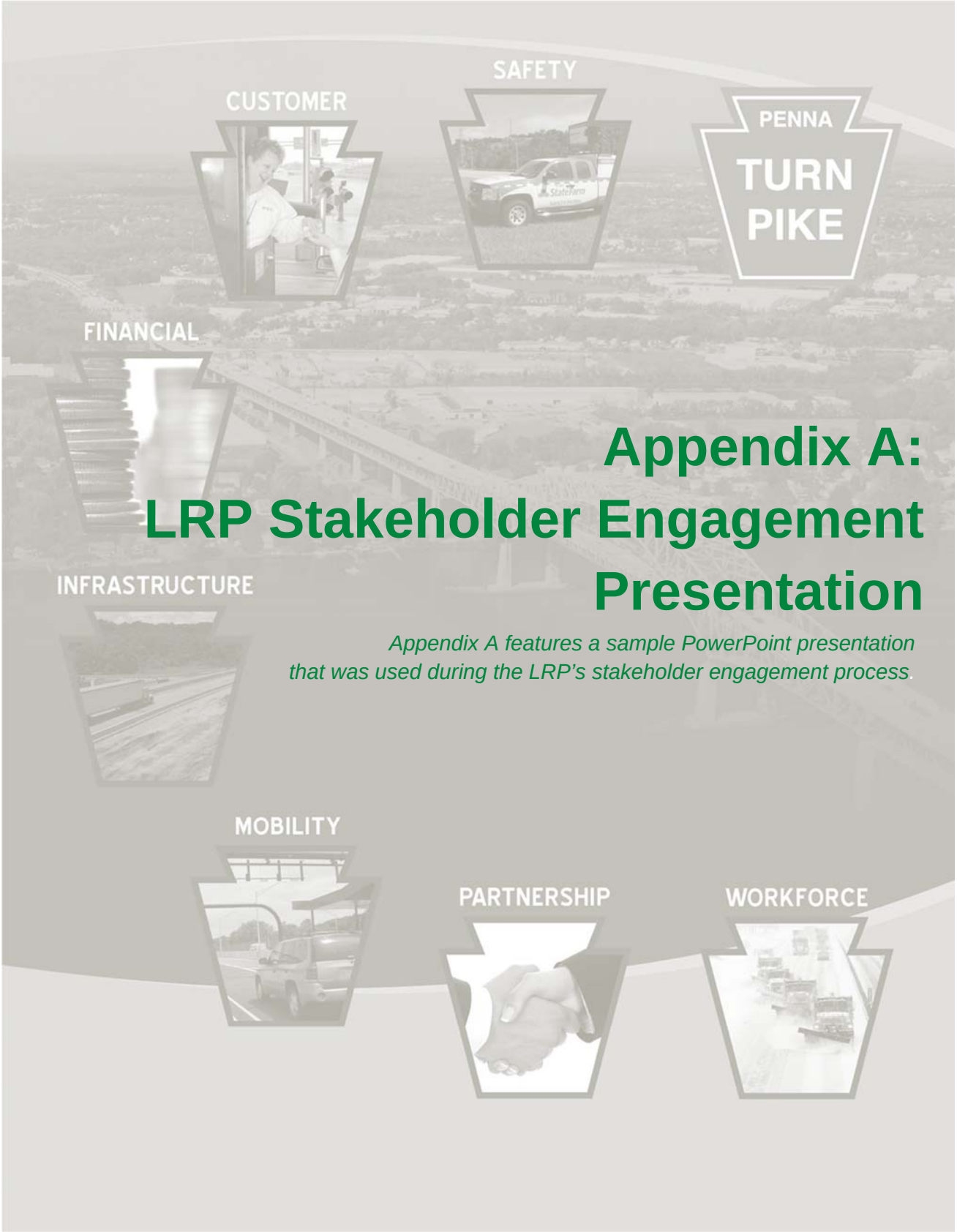
Implement the Protection-driven Scenario – From the analysis performed as part of the LRP update, the PTC will need to move toward a Capital Plan of more modest dimensions. An average annual program of $520 million a year through the plan horizon year of 2035, maintaining the same historic program proportions, will ensure that the PTC will be able to manage its debt service while still being able to maintain its assets at an acceptable operating condition. With the adoption of the FY17 Capital Plan, the PTC has already moved in this direction to a Protection-driven program.

Refine a Project Prioritization/Evaluation Process – This Long Range Plan documents the prioritization process for FEMO program, the Fleet program, the IT program, and the categories within the Highway program. Each program has methods from which candidate projects are considered and evaluated. The refined process should define how projects are prioritized between programs, be shaped by the PTC's strategic drivers and use quantitative data where possible. The prioritization process would be created not to replace human judgment, but to serve as a planning tool that can inform PTC management of the relative merits of candidate projects before they are incorporated into short- and long-range planning and capital plans. In administering an annual program of $520 million, it is critical the PTC ensures that it is programming only the most effective projects from the four program areas.

Continue the Development of an Enterprise Data Repository – This Long Range Plan developed the framework for an integrated, innovative Enterprise Asset Management System (EAMS). This new enterprise approach can improve asset utilization and performance, optimize capital cost needs, optimize asset-related operating costs, and improve the PTC's return on its capital investments. This system would also serve as a critical foundation to the PTC's performance measures and metrics scorecard initiatives. The PTC has purchased an asset management software platform and is moving forward with a sign inventory asset management system and a pavement asset management system.

Continue to Monitor Technology Advances, including Connected and Autonomous Vehicles – Advances in the development of technology is moving forward at a breath-taking pace and have the potential to impact all of the PTC's seven strategic drivers (Safety, Customer, Financial, Infrastructure, Mobility, Partnership, and Workforce). As an example, recent guidance from NHTSA and forthcoming legislation from the Pennsylvania General Assembly both point to a quickly evolving world of transportation where connected and autonomous vehicles will one day become the norm, as opposed to mere objects of speculation. As such, the PTC is making strides to adapt its roadway infrastructure for accommodating this changing technology (e.g., the P3 Fiber project). The PTC should remain abreast of ongoing developments of this technology.

Maintain a commitment to planning and performance management - The Pennsylvania Turnpike Commission is a dynamic organization. As the PTC evolves, it must do so with a commitment to how it plans and programs for the future. As such, the planning processes now in place give the PTC opportunities to take stock of its inventory of assets and approaches to delivering projects through its Strategic Plan, Strategic Performance Report (metrics), Long Range Plan, and Business Plans.

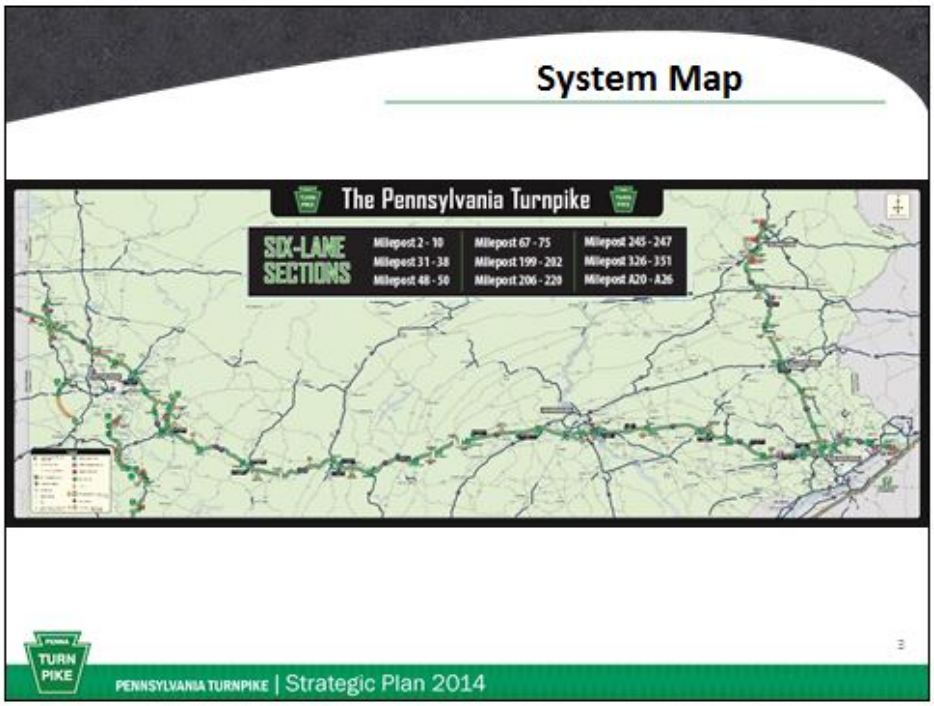


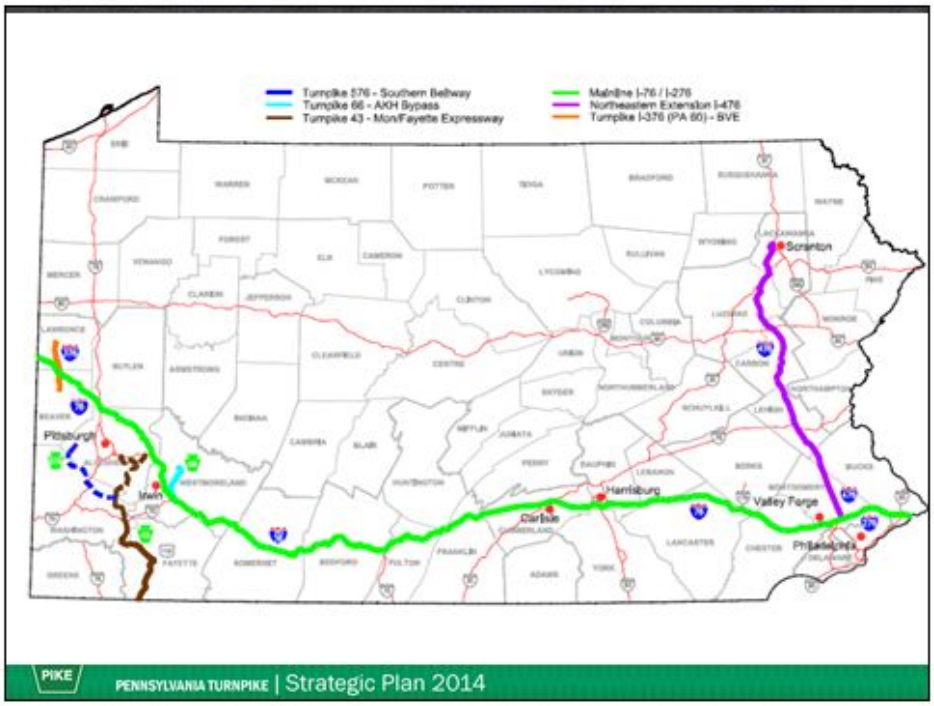
Appendix A: LRP Stakeholder Engagement Presentation

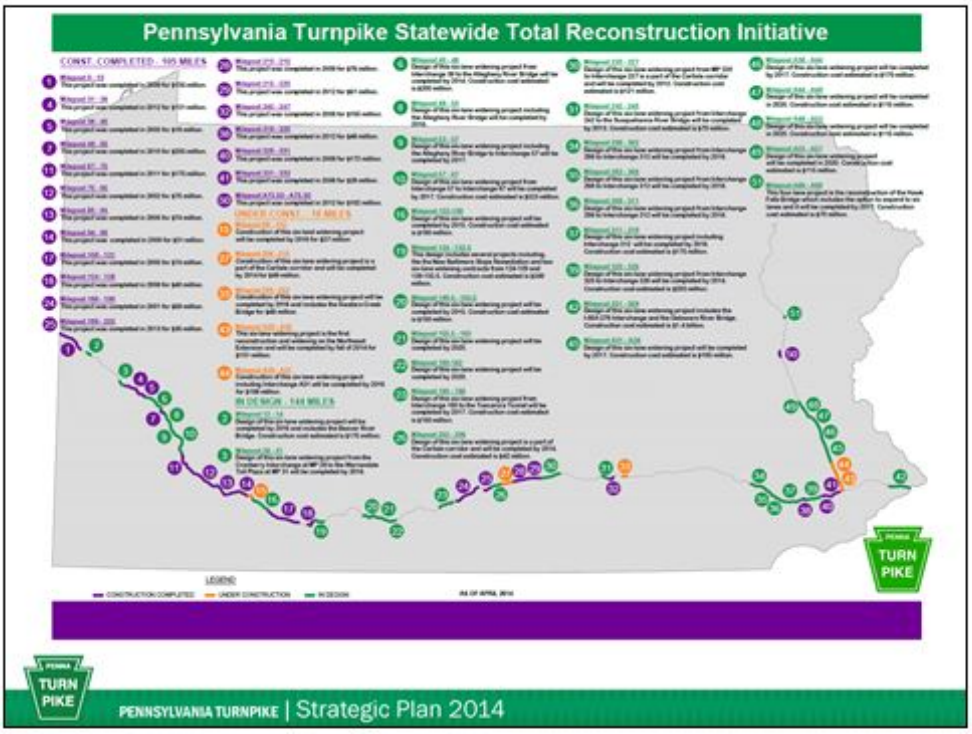
Appendix A features a sample PowerPoint presentation that was used during the LRP's stakeholder engagement process.

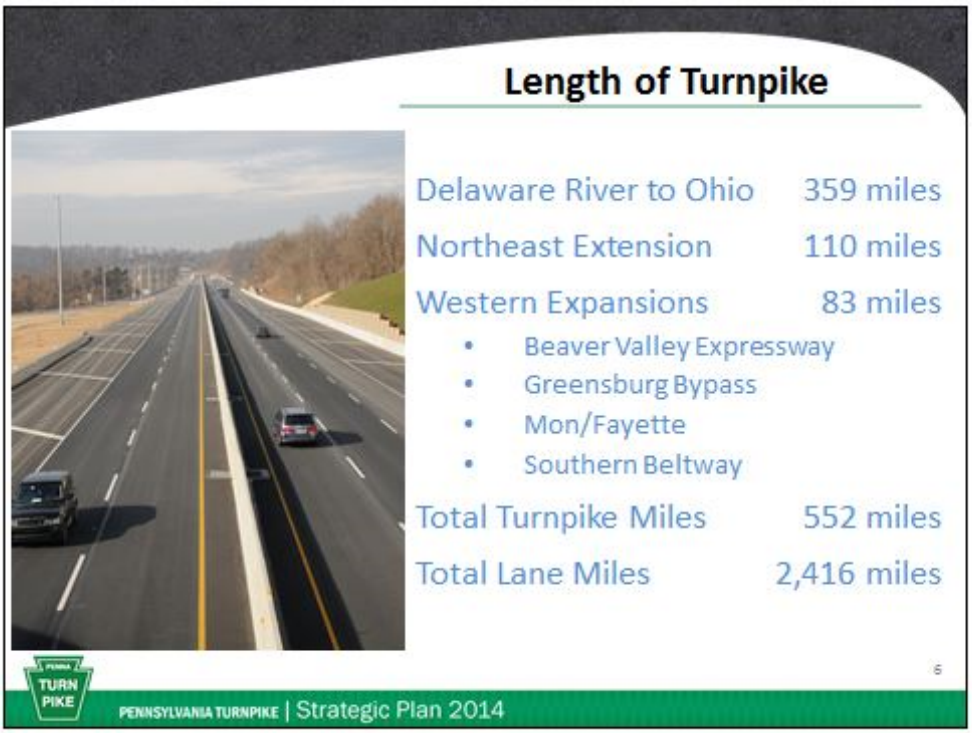

Long Range Plan Update
Central Pennsylvania Stakeholders
PENNSYLVANIA TURNPIKE | Strategic Plan 2014


PENNSYLVANIA TURNPIKE COMISSION
FAST FACTS
PENNSYLVANIA TURNPIKE | Strategic Plan 2014


System Map
The Pennsylvania Turnpike
SIX-LANE SECTIONS
Milepost 2 - 10
Milepost 31 - 38
Milepost 48 - 50
Milepost 67 - 75
Milepost 199 - 202
Milepost 206 - 220
Milepost 245 - 247
Milepost 326 - 351
Milepost A20 - A26
TURN PIKE
PENNSYLVANIA TURNPIKE | Strategic Plan 2014


Turnpike 576 - Southern Beltway
Turnpike 66 - AKH Bypass
Turnpike 43 - Mon/Fayette Expressway
Mainline I-76 / I-276
Northeastern Extension I-476
Turnpike I-376 (PA 60) - SVE
Scranton
Pittsburgh
Irwin
Harrisburg
Carlisle
Valley Forge
Philadelphia
PIKE
PENNSYLVANIA TURNPIKE | Strategic Plan 2014


Pennsylvania Turnpike Statewide Total Reconstruction Initiative
PENNSYLVANIA TURNPIKE | Strategic Plan 2014


Length of Turnpike
Delaware River to Ohio 359 miles
Northeast Extension 110 miles
Western Expansions 83 miles
• Beaver Valley Expressway
• Greensburg Bypass
• Mon/Fayette
• Southern Beltway
Total Turnpike Miles 552 miles
Total Lane Miles 2,416 miles
PENNSYLVANIA TURNPIKE | Strategic Plan 2014

Average Traffic Volume

(FISCAL YEAR 2013-2014 UNLESS NOTED)

Total Vehicles per Fiscal Year	194,070,031
Vehicles per Day	531,699
Commercial Vehicles per Day	70,900
Vehicles in 1941 (First Full Year of Operation)	2,400,000

7

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

Traffic Composition

(FISCAL YEAR 2013-2014)

Passenger Vehicles	86.7%
Commercial Vehicles (Trucks/Buses)	13.3%

8

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

Fare Collection Facilities

Delaware River to Ohio State Line	32
(Includes E-Zpass Only Interchanges: Route 29, Virginia Drive, Street Road)	
Northeast Extension	10
Western Expansions	25
Total Fare Collection Facilities	67

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

Service Plazas

Delaware River to Ohio State Line	15
Northeastern Extension	2
Total Service Plazas	17

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

Maintenance Facilities

Maintenance Buildings	22
Tunnels	5
Total Maintenance Facilities	27

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

Employee Composition

(FISCAL YEAR 2013-2014)

Non-Union	442
Total Union	1,534
• Union Toll Collectors*	589
• Union Maintenance Workers	707
Total Employees	1,976

Supplemental Toll Collectors = 103

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

E-ZPass Growth

Year	E-ZPass Accounts Opened per Year	E-ZPass Transactions per year (millions)	% of Total Transactions	E-ZPass Revenue per Year (millions)	% of Total Revenue
2003	92,805	55.6	36%	$155.2	35%
2004	96,415	66.5	42%	$197.4	43%
2005	94,094	76.1	46%	$266.2	50%
2006	96,290	84.0	52%	$350.7	56%
2007	104,676	92.9	55%	$355.0	59%
2008	100,559	99.1	57%	$360.5	61%
2009	116,150	105.1	60%	$455.7	63%
2010	143,059	112.2	62%	$471.6	65%
2011	145,750	117.5	65%	$503.6	66%
2012	176,199	125.0	67%	$526.5	67%
2013	195,957	134.2	71%	$571.5	69%
2014	221,717	140.9	74%	$612.1	70%
2015	216,416	145.7	75%	$658.9	71%
2016*	227,856	152.4	77%	$727.1	74%

** Represents Fiscal Year data*

TURN PIKE

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

Tunnels

(TURNPIKE 76, 70, 276, 476)

	Length	Year Opened
Allegheny	6,070 ft.	1940
Tuscarora Mountain	5,326 ft.	1940
Kittatinny Mountain	4,727 ft.	1940
Lehigh	4,461 ft.	1957
Blue Mountain	4,339 ft.	1940

TURN PIKE

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

Major Bridges*

	Length	Year Opened
Delaware River	6,571 ft.	1956
Susquehanna River	5,918 ft.	2007
Ronald "Smokey" Bakewell Bridge	3,078 ft.	2012
Joe Montana Bridge	2,516 ft.	2000
Allegheny River	2,350 ft.	2010
Pigeon Creek/Park Avenue	1,788 ft.	2001
Mahoning River	1,700 ft.	1992
Dunlap Creek	1,675 ft.	2011
Clarks Summit	1,627 ft.	1955
Lehigh River	1,547 ft.	2012
Beaver River	1,546 ft.	1950
PA Rt. 60/McCaslin Rd.	1,545 ft.	2004
Taylor Run Road	1,419 ft.	1999
Hazelkirk Road	1,360 ft.	2001
Schuylkill River	1,233 ft.	1954

*Does not include ramp or interchange bridges

15

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

Total Reconstruction

Year	Total Miles	Location	Total Cost	# of Lanes
2000	5.23 miles	Milepost 94 - 99	$ 31 million	5
2001	13.09 miles	Milepost 186 - 199	$ 58 million	4
2002	9.63 miles	Milepost 75 - 85	$ 75 million	4
2005	1.78 miles	Milepost 38 - 40	$ 18 million	4
	9.00 miles	Milepost 85 - 94	$ 74 million	4
	12.53 miles	Milepost 109 - 121	$ 74 million	4
2006	2.92 miles	Milepost 331 - 333	$ 28 million	6
2008	2.96 miles	Milepost 124 - 128	$ 40 million	5
	2.55 miles	Milepost 245 - 247	$155 million	6
	5.32 miles	Milepost 326 - 331	$172 million	6
2009	9.29 miles	Milepost 0 - 10	$135 million	6
	4.37 miles	Milepost 210 - 215	$ 76 million	6
2010	1.93 miles	Milepost 48 - 50	$205 million	6
2011	7.78 miles	Milepost 67 - 75	$175 million	6
2012	6.42 miles	Milepost 31 - 38	$131 million	6
	5.01 miles	Milepost 215 - 220	$ 51 million	6
	0.41 mile	Milepost 319 - 320	$ 48 million	4
	1.80 miles	Milepost A73.5 - A 75.3	$102 million	4
Totals	102.02 miles	Statewide	$1.65 Billion	

16

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

Elevations

Highest: 2,603.33 feet above sea level
- Milepost 100.45 (Somerset County)

Lowest: 33.25 feet above sea level
- Milepost 357.25 (Bucks County)

Interchanges

Largest Mainline Interchanges Valley Forge & Mid-County
- Valley Forge: 17 Lanes (6 Entry Lanes / 11 Exit Lanes)
- Mid-County: 17 Lanes (8 Entry Lanes / 9 Exit Lanes)

Smallest Mainline Interchanges
- Donegal/Ft. Littleton/Willow Hill/Blue Mountain/Wilkes-Barre
- 4 Lanes Each (2 Entry Lanes / 2 Exist Lanes)

Most Heavily Used Interchange Mid-County
- Average 78,756 Vehicles per Day

Least Heavily Used Interchange Willow Hill
- Average 974 Vehicles per Day

Financial Data

Net Annual Toll Revenue by Fiscal Year

June 1, 2013 – May 31, 2014	$861.8 million
June 1, 2012 – May 31, 2013	$811.5 million
June 1, 2011 – May 31, 2012	$780.8 million
June 1, 2010 – May 31, 2011	$739.7 million
June 1, 2009 – May 31, 2010	$693.8 million

Toll Revenue Composition

Passenger Vehicles	57.7%
Commercial Vehicles	42.7%

19

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

Senior Revenue Bond Rating

Moody's	A1
Standard & Poor's	A+
Fitch Ratings	A+

20

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

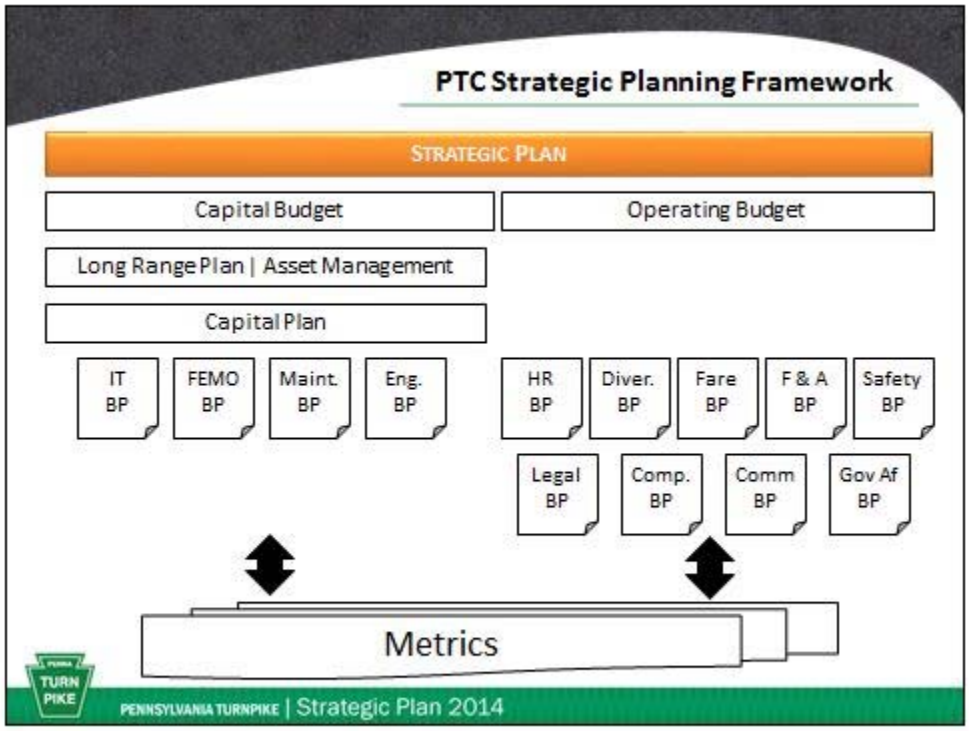
Toll Increase History

(1940 – 2014)

Date of Toll Rate	Percent Increase	E-ZPass 'Discount'
October 1, 1940	[Original Rate]	
September 1, 1969	82%	
August 1, 1978	23%	
January 2, 1987	30%	
June 1, 1991	30%	
August 1, 2004	42.5%	
January 4, 2009	25%	
January 3, 2010	3%	
January 2, 2011	3% (E-ZPass)	-7%
January 2, 2011	10% (Cash)	
January 1, 2012	0% (E-ZPass)	-17%
January 1, 2012	10% (Cash)	
January 6, 2013	2% (E-ZPass)	-25%
January 6, 2013	10% (Cash)	
January 5, 2014	2% (E-ZPass)	-35%
January 5, 2014	12% (Cash)	

PENNSYLVANIA TURNPIKE COMISSION

STRATEGIC AND LONG RANGE PLANNING


PTC Strategic Planning Framework
STRATEGIC PLAN
Capital Budget
Operating Budget
Long Range Plan | Asset Management
Capital Plan
IT BP
FEMO BP
Maint. BP
Eng. BP
HR BP
Diver. BP
Fare BP
F & A BP
Safety BP
Legal BP
Comp. BP
Comm BP
Gov Af BP
Metrics
PENNSYLVANIA TURNPIKE | Strategic Plan 2014


Strategic Plan: Driving Toward Success
Mission: To provide a safe, reliable, customer-valued toll road system that supports national mobility and commerce.
OUR MISSION
PENNSYLVANIA TURNPIKE | Strategic Plan 2014

Strategic Plan: Driving Toward Success

Vision: *In serving our customers, we will reaffirm ourselves as the world's finest superhighway by:*

- *Fulfilling our public responsibility to provide a safe, sustainable, uninterrupted travel experience*
- *Becoming an industry leader, a valued business partner and trusted employer.*

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

Strategic Plan: Driving Toward Success

Values:

- *Communication*
- *Customer Service*
- *Diversity*
- *Innovation*
- *Integrity*
- *Professionalism*
- *Safety*
- *Stewardship*
- *Teamwork*

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

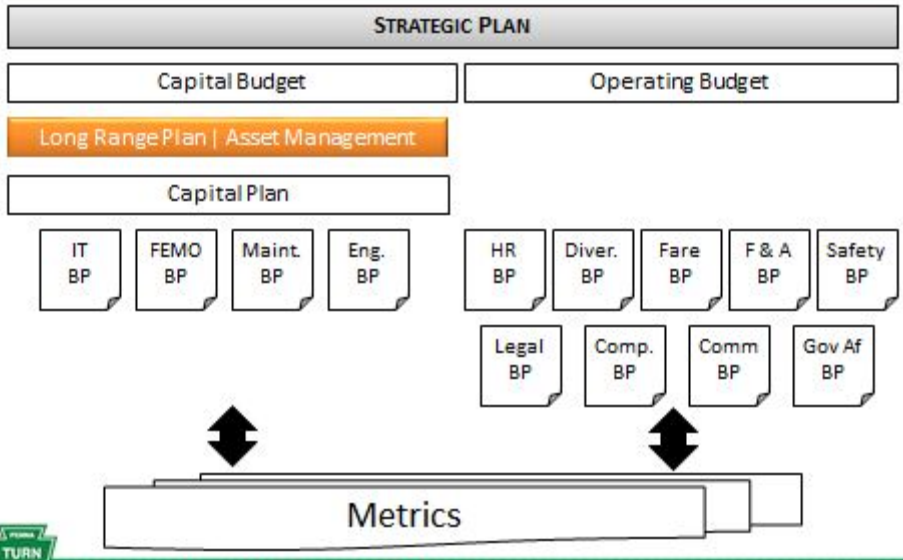
Strategic Plan: Driving Toward Success

Strategic Drivers:

- *Safety*
- *Customer*
- *Workforce*
- *Infrastructure*
- *Financial*
- *Toll Collection Technology*
- *Legislative/Regulatory*

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

PTC Strategic Planning Framework



PENNSYLVANIA TURNPIKE | Strategic Plan 2014

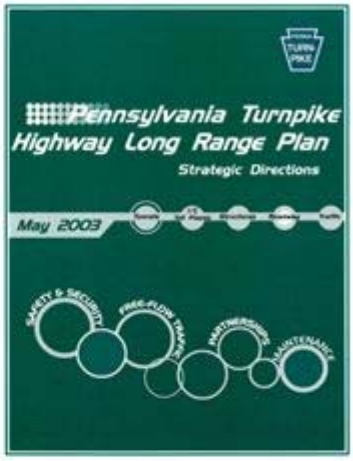
PTC Long Range Plan Update

May 2003 Highway Long Range Plan:

- Elements
  - Roadways
  - Interchanges/Toll Plazas
  - Structures
  - Tunnels
- Pre-Act 44

New 20-Year Plan:

- Highway
- Fleet
- Facilities
- Information Technology (AET)



29

PENNSYLVANIA TURNPIKE | Strategic Plan 2014

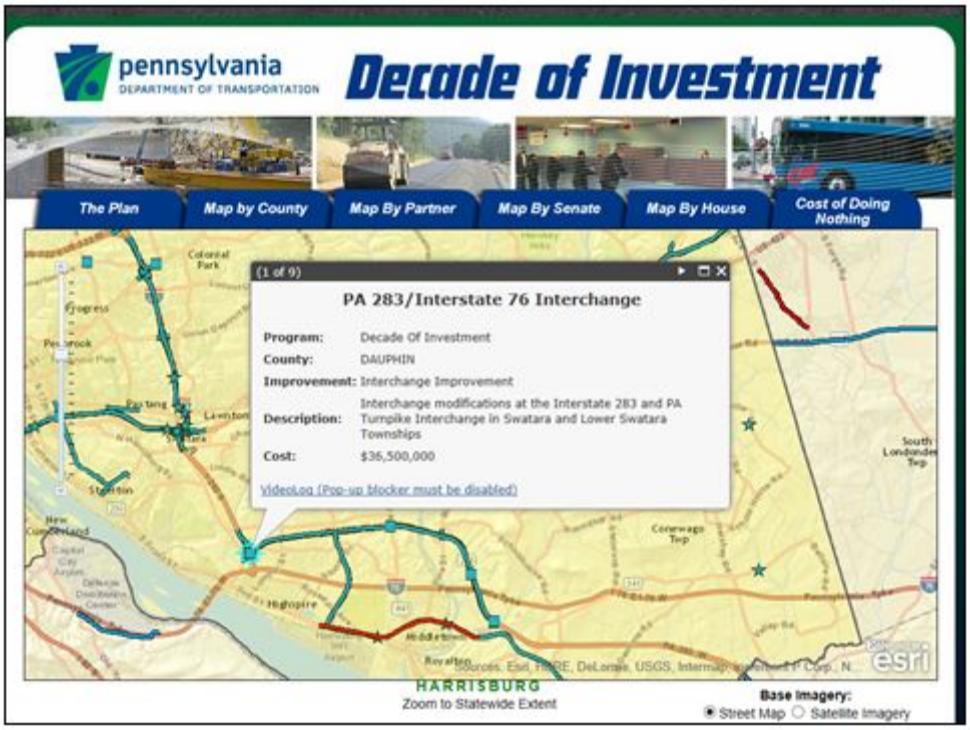
Central PA Initiatives

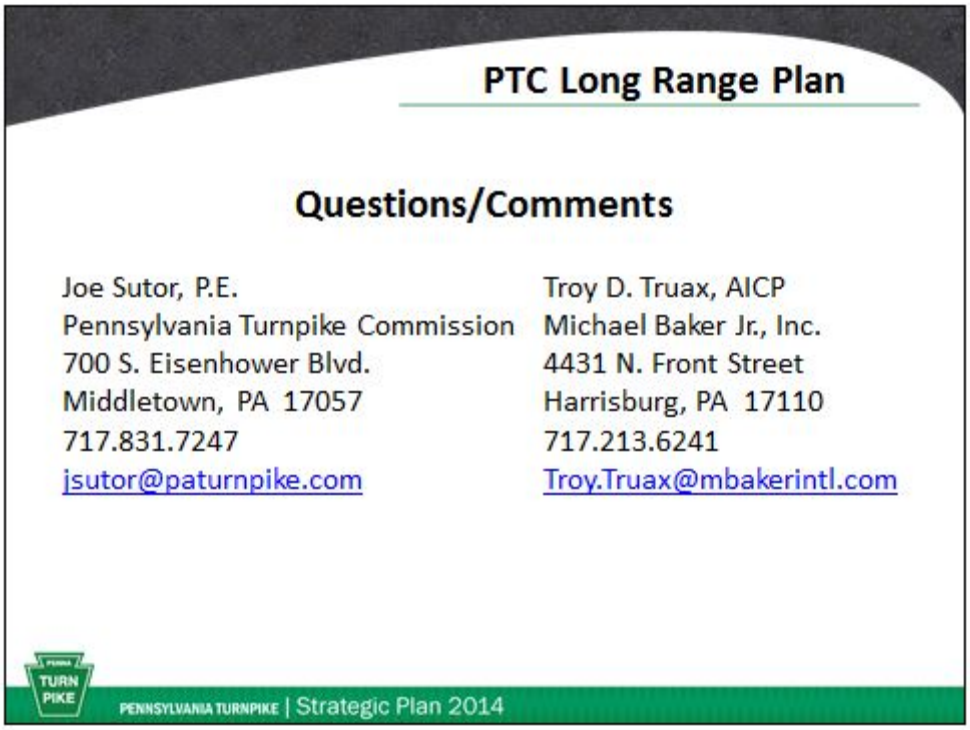
Focus Areas for MPO Input:

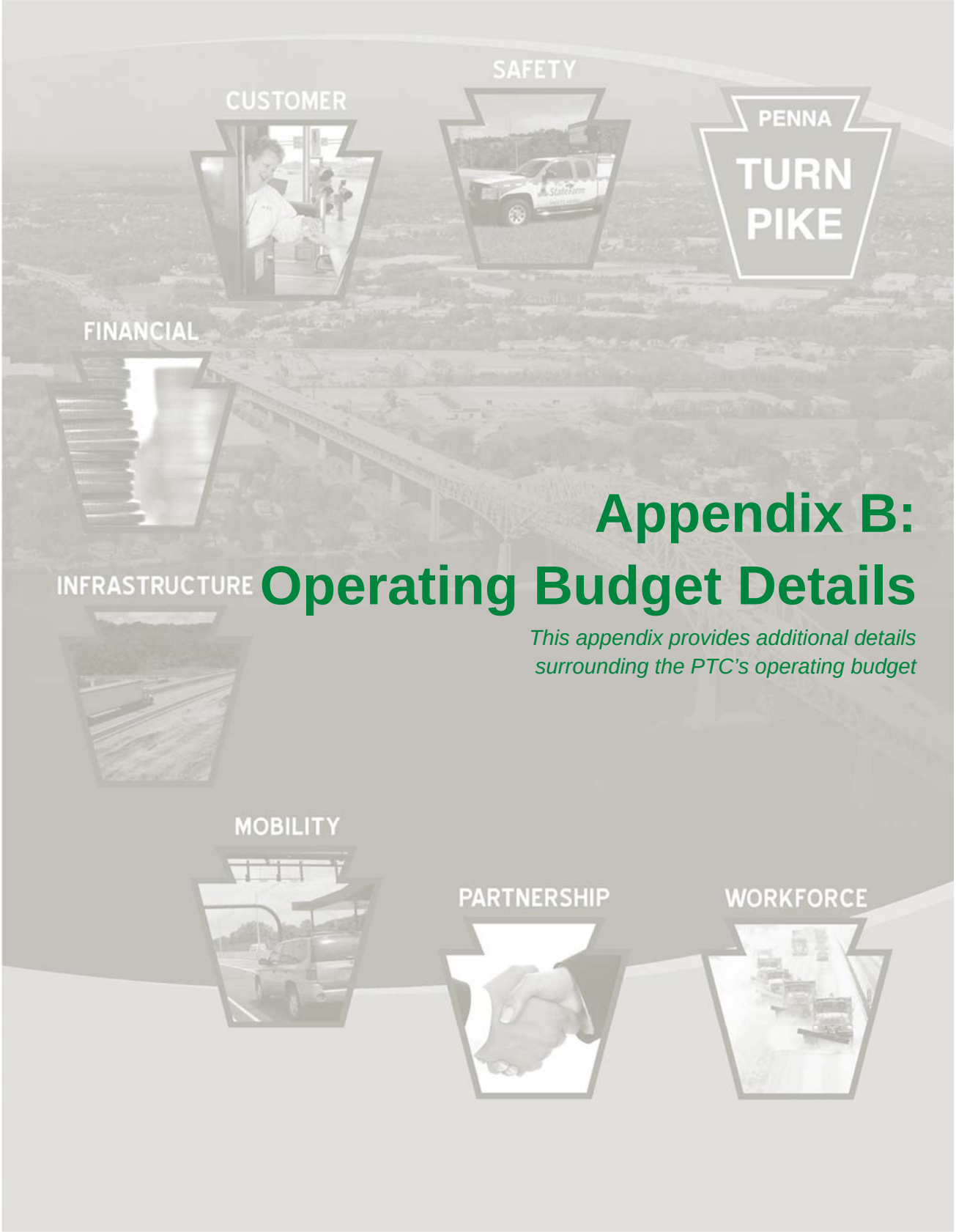
- Major projects
- Congestion and commerce
- Goods and service movements
- Decade of Investment projects
- New access points and coordinated improvements with adjacent roadways
- Interstate tolling
- Technology advancements (e.g., Autonomous Vehicle Technology, etc.)
- Emergency preparedness and incident response
- Communications

30

PENNSYLVANIA TURNPIKE | Strategic Plan 2014


pennsylvania
DEPARTMENT OF TRANSPORTATION
Decade of Investment
The Plan
Map by County
Map By Partner
Map By Senate
Map By House
Cost of Doing Nothing
(1 of 9)
PA 283/Interstate 76 Interchange
Program: Decade Of Investment
County: DAUPHIN
Improvement: Interchange Improvement
Description: Interchange modifications at the Interstate 283 and PA Turnpike Interchange in Swatara and Lower Swatara Townships
Cost: $36,500,000
VideoLog (Pop-up blocker must be disabled)
HARRISBURG
Zoom to Statewide Extent
Base Imagery:
Street Map
Satellite Imagery


PTC Long Range Plan
Questions/Comments
Joe Sutor, P.E.
Pennsylvania Turnpike Commission
700 S. Eisenhower Blvd.
Middletown, PA 17057
717.831.7247
jsutor@paturnpike.com
Troy D. Truax, AICP
Michael Baker Jr., Inc.
4431 N. Front Street
Harrisburg, PA 17110
717.213.6241
Troy.Truax@mbakerintl.com
TURN PIKE
PENNSYLVANIA TURNPIKE | Strategic Plan 2014



Appendix B: Operating Budget Details

This appendix provides additional details surrounding the PTC's operating budget

The following tables highlight expenses for employees and the Pennsylvania State Police, respectively.

Table B-1: Employee Benefit Expenses for FY11-12 through FY15-16

Operating Expenses	FY12-13 Approved Budget	FY12-13 Approved Budget	FY13-14 Approved Budget	FY14-15 Preliminary Budget	FY15-16 Approved Budget	% Change 2012-15
SERS Retirement Contributions[19]	$8,496,878	$12,937,426	$18,994,597	$24,852,137	$30,879,123	**263.4%**
Medical Insurance (Hospitalization)	$23,154,590	$24,804,622	$26,068,216	$28,306,845	$28,635,904	**23.7%**
Prescriptions	$4,998,285	$5,342,573	$5,342,577	$5,342,875	$6,059,635	**21.2%**
OPEB	$28,821,000	$29,847,500	$24,019,967	$20,398,062	$19,145,000	**-33.6%**
All Other Benefits	$12,933,241	$13,724,400	$13,034,213	$10,290,566	$10,490,981	**-18.9%**
Sub-total Employee Benefits Expenses	**$78,403,994**	**$86,656,521**	**$87,459,570**	**$89,190,485**	**$95,210,643**	**21.4%**

Table B-2: Pennsylvania State Police Expenses for FY11-12 through FY15-16

Operating Expenses	FY12-13 Approved Budget	FY12-13 Approved Budget	FY13-14 Approved Budget	FY14-15 Preliminary Budget	FY15-16 Approved Budget	% Change 2012-15
Personnel	$20,844,966	$21,148,135	$20,623,817	$20,979,285	$21,393,180	**2.6%**
Benefits	$10,782,832	$11,136,861	$11,136,881	$12,872,571	$13,564,761	**25.8%**
Overhead/Other	$4,858,792	$4,895,004	$5,419,302	$6,877,570	$5,774,394	**18.8%**
Sub-total PA State Police Expenses	**$36,486,590**	**$37,180,000**	**$37,180,000**	**$40,729,426**	**$40,732,335**	**11.6%**

Revenues associated with the PTC's operations are considered operating revenues. The primary operating revenues of the PTC are tolls from customers. Other operating revenues include: service plaza, real property and other rental income, electronic toll collection, and violation enforcement fees related to the E-ZPass program. Also included is revenue from

[19] State Employees Retirement System

various sponsorship agreements. Total operation revenue collected in FY14 amounted to $880.1 million.

The PTC has a goal of maintaining its annual operations and maintenance cost growth to a maximum of 4 percent through ongoing cost containment and efficiency measures. In addition to operating the Turnpike, these expenses include pension contributions as required by the State Employees Retirement System (SERS) and funding OPEB[20] obligations. The PTC's financial plans assume that it will hold operations and maintenance expense growth to a maximum 4 percent annual rate.

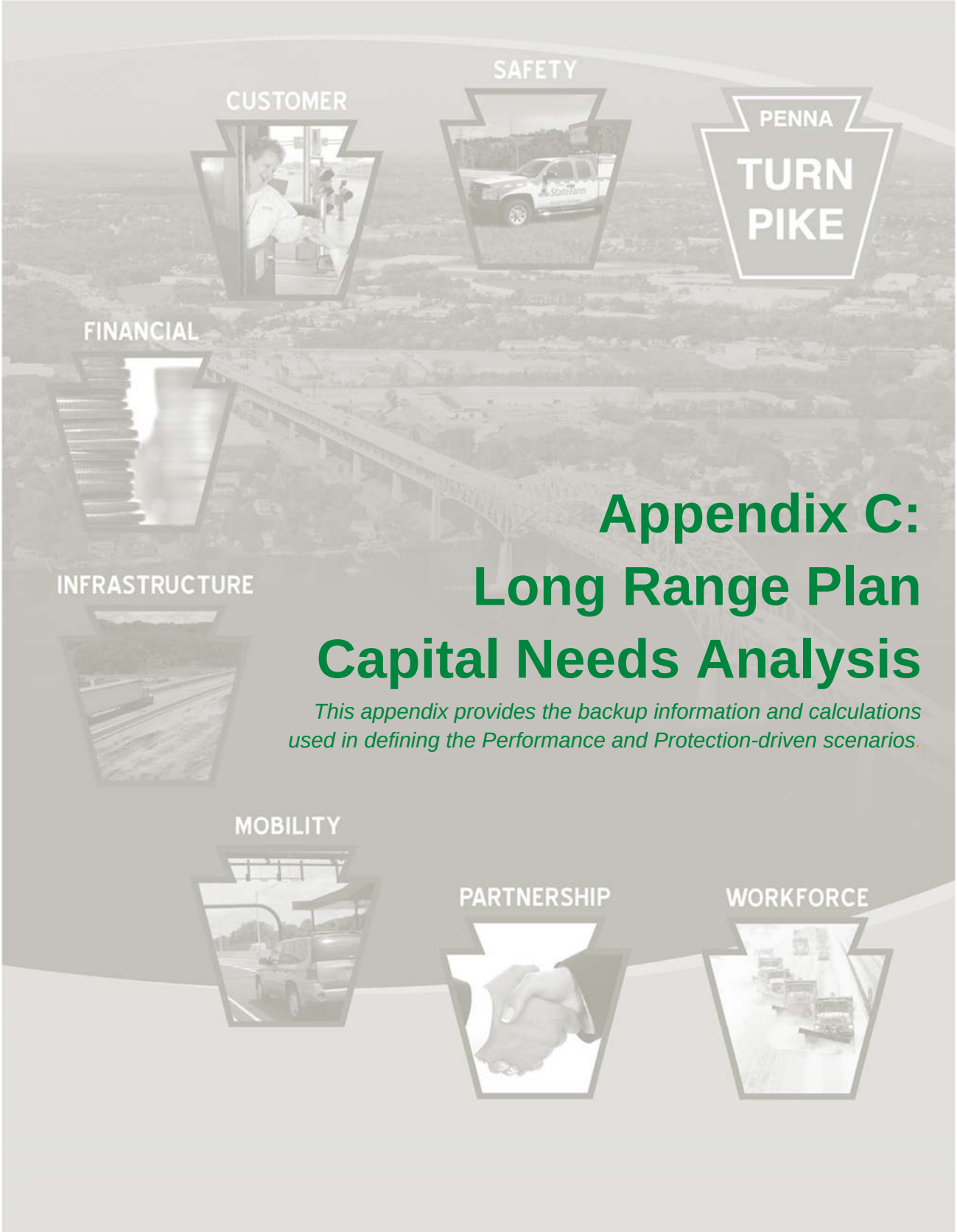
A summary of the PTC's existing and projected operating expenses, from now through FY20, is depicted in the following table.

[20] Other post-employment benefits

Table 13: Existing and Projected 5-Year Operating Expenses, 2015-20

Commitment Item	2015 Actual	5-year % growth (2011-15)	2016 Projected	2017 Projected	2018 Projected	2019 Projected	2020 Projected	5-year % Growth (2016-20)
Wages & Salaries	$111,647,557	1.37%	$111,706,309	$114,033,518	$116,884,356	$120,098,676	$123,701,636	10.74%
Employee Benefits	$75,311,731	83.05%	$80,586,939	$86,586,939	$88,751,612	$91,192,282	$93,928,050	16.55%
Retiree Benefits	$20,398,012	-23.69%	$19,875,592	$20,273,104	$20,779,931	$21,351,380	$21,991,921	10.65%
Training & Education	$500,114	103.39%	$708,498	$722,668	$740,735	$761,105	$783,938	10.65%
Professional Fees & Services	$35,574,137	10.19%	$35,481,482	$38,781,482	$39,751,019	$40,844,172	$42,069,497	18.57%
PA State Police	$41,113,009	21.08%	$42,861,544	$44,418,624	$45,529,090	$46,781,140	$48,184,574	12.42%
Travel & Meals	$801,133	76.76%	$831,788	$848,424	$869,634	$893,549	$920,356	10.65%
Utilities	$7,271,133	-6.60%	$7,360,511	$7,240,511	$7,421,524	$7,625,616	$7,854,384	6.71%
Telephone & Communications	$2,050,896	18.77%	$2,087,257	$2,187,257	$2,241,938	$2,303,592	$2,372,699	13.68%
Fuels	$4,629,975	2.23%	$4,051,980	$4,133,020	$4,236,345	$4,352,845	$4,483,430	10.65%
Lease & Rental	$473,012	59.44%	$510,848	$521,065	$534,092	$548,779	$565,242	10.65%
Materials & Supplies	$23,398,076	42.07%	$23,274,120	$24,274,120	$24,880,973	$25,565,200	$26,332,156	13.14%
Small Tools & Equipment	$376,264	-28.77%	$380,505	$388,115	$397,818	$408,758	$421,021	10.65%
Postage & Freight	$183,355	74.03%	$201,441	$205,470	$210,607	$216,398	$222,890	10.65%
Computer Software	$8,196,629	74.15%	$9,450,133	$9,950,133	$10,198,886	$10,479,356	$10,793,736	14.22%
Advertising & Publicity	$1,608,140	116.05%	$1,852,441	$1,889,490	$1,936,727	$1,989,987	$2,049,687	10.65%
Environmental & Hazmat	$441,588	-17.69%	$437,162	$445,905	$457,053	$469,622	$483,710	10.65%
Insurance	$2,721,320	45.90%	$2,352,100	$2,052,100	$2,103,403	$2,161,246	$2,226,083	-5.36%
Miscellaneous Expenses	$-39,705	79.06%	$-9,492	$-9,682	$-9,924	$-10,197	$-10,503	10.65%
Bank & Investment Fees	$11,982,858	29.63%	$12,478,104	$13,478,104	$13,815,057	$14,194,971	$14,620,820	17.17%
Collection/ Unrecoverable Fees	$382,803	50.61%	$368,504	$548,504	$562,217	$577,678	$595,008	61.47%
Self Insurance		-100.00%	0	0	0	0	0	0%
Inventory/COGS	$3,244,115	271.55%	$3,059,741	$3,120,936	$3,198,959	$3,286,931	$3,385,539	10.65%
Construction Contracts	$181,474	-36.94%	$495,749	$505,664	$518,306	$532,559	$548,536	10.65%
Hardware & Storage	$94,417	-80.91%	$309,216	$315,400	$323,285	$332,176	$342,141	10.65%
Legal Contingency/Tort	$0	-100.00%	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	0.00%
Amortization	$0	-100.00%	$0	$0	$0	$0	$0	0%
Cost Of Services	$352,542,043	19.34%	$366,712,472	$382,910,870	$392,333,642	$402,957,817	$414,866,552	13.13%
Year over Year Difference $	$18,739,839	$57,122,683	$14,170,429	$16,198,398	$9,422,772	$10,624,175	$11,908,735	$48,154,080
Year over Year Difference %	5.61%	19.34%	4.02%	4.42%	2.46%	2.71%	2.96%	13.13%
Average Growth $	$11,424,537						$12,464,902	
Average Growth %	3.62%						3.31%	

Source: PTC Finance Department, December 2015



Appendix C: Long Range Plan Capital Needs Analysis

This appendix provides the backup information and calculations used in defining the Performance and Protection-driven scenarios.

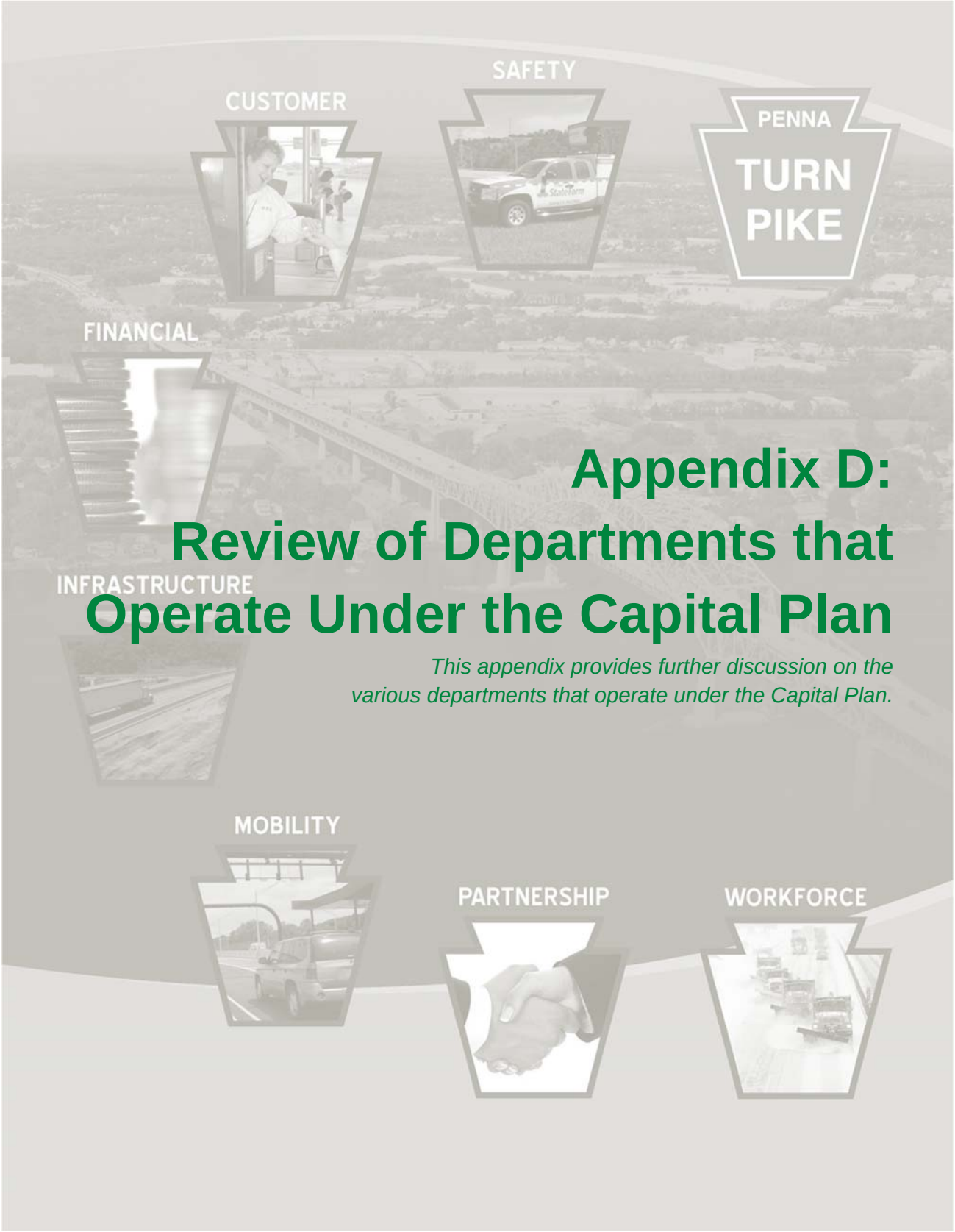
Table C-1: Long Range Plan Capital Needs Analysis (PV)

Major Category/ Strategic Driver	Assumptions	Scenario Description	Year Complete	Back-Up Calculations				Scenario Total Annual Average	FY16 10-Year Capital Plan Annual Average	Notes/Comments
				Unit	Unit Cost	Total	20-Yr Annual			
Reconstruction *Increase mobility and reliability in travel time; Maintain a "Good" Pavement Condition Rating (PCR)*	**TR**: $30m/mi "all-in" costs **NE Ext Rehab**: $15m/mi "reconstruction in place"	1. Performance-Driven (Complete the Total Reconstruction program by 2030)	2030	Total Reconstruction				**$600m**	**$283m**	▪ Total reconstruction program includes 410 miles, minus 115 miles completed = 295 miles remaining ▪ NE Extension Rehabilitation is from MP A75 to A131 ▪ Includes Mid-County to Bensalem (10 lanes) ▪ Adds 626 lane miles to the system
				277 mi	$30m/mi	$8.31b	$416m/yr			
				NE Extension Rehab						
				56 mi	$15m/mi	$840m	$42m/yr			
				Mid-county to Bensalem						
				18 mi	$160m/mi	$2.9b	$145m/yr			
		2. Performance-Driven (Complete the Total Reconstruction program with Current Staffing)	2046	Total Reconstruction				**$310m**	**$283m**	▪ Assumes a rate of 9 miles per year ▪ Does NOT include Mid-County to Bensalem ▪ Adds 554 lane miles to the system by 2046 ▪ Customer Tolerance
				9mi/yr	$30m/mi	$5.40b	$270m/yr			
				NE Extension Rehab						
				56 mi	$15m/mi	$840m	$42m/yr			
		3. Performance-Driven (Maintain LOS D on urban segments and LOS C on rural segments)	2035	Total Reconstruction				**$280m**	**$283m**	▪ Maintains LOS D for urban segments and LOS C for rural segments ▪ Addresses capacity needs between Warrendale & Breezewood, and Morgantown & Lehigh Valley = 144 miles ▪ Includes Mid-County to Bensalem ▪ Adds 360 lane miles to the system
				144 mi	$30m/mi	$4.32b	$216m/yr			
				Mid-county to Bensalem						
				18 mi	$70m/mi	$1.26b	$63m/yr			
		4. Protection-Driven (Maintain LOS E on all segments)	2035	Total Reconstruction				**$245m**	**$283m**	▪ Maintains LOS E for all segments ▪ Addresses capacity needs between Butler Valley & Irwin, and Morgantown & Lehigh Valley = 83 miles ▪ Includes Mid-County to Bensalem (8 lanes) ▪ Adds 236 lane miles to the system
				83 mi	$30m/mi	$2.49b	$125m/yr			
				Mid-county to Bensalem						
				18 mi	$135m/mi	$2.44b	$122m/yr			

Major Category/ Strategic Driver	Assumptions	Scenario Description	Year Complete	Back-Up Calculations				Scenario Total Annual Average	FY16 10-Year Capital Plan Annual Average	Notes/Comments
				Unit	Unit Cost	Total	20-Yr Annual			
Pavement (Surface) *Maintain a "Good" Pavement Condition Rating (PCR)*	**Mill/Resurface**: every 10 years @ $1.5m/mi to include safety and other highway improvements	1. Performance-Driven	n/a	43 mi/yr.	$1.5m/mi	$1.29b	$65m/yr	**$65m**	**$68m**	▪ Assumes Scenario 2 from the Total Reconstruction program ▪ 550 miles = 55 miles/yr. ▪ 55 miles/yr. – Total Reconstruction (9mi/yr.) – NE Ext rehabilitation (3 miles/yr.) = 43 miles/yr.
		2. Protection-Driven	n/a	50 mi/yr.	$1.5m/mi	$1.50b	$75m/yr	**$75m**	**$68m**	▪ Assumes Scenario 4 from the Total Recon program ▪ Increases miles per year by say 15% due to less reconstruction
Structures/Bridges *Maintain the number and weighted percentage of SD bridges by deck area*	"Touch" every bridge every 20 years	1. Performance-Driven	n/a	Replacements				**$65m**	**$78m**	▪ Assumes Scenario 2 from the Total Reconstruction program ▪ 866 structures, avg. 12,000 SF deck area per structure ▪ 90% rehabilitations; 10% replacements ▪ Assumes 25% reduction due to Total Reconstruction projects
				780k SF deck	$400/SF	$312m	$16m/yr			
				Rehabilitations						
				7m SF deck	$135/SF	$948m	$47m/yr			
		2. Performance-Driven	n/a	From GHD model, maintain a level of funding to keep SD percentage at 4%.				**$45m**	**$78m**	▪ Assumes Scenario 2 from the Total Reconstruction program ▪ Assumes 25% reduction due to Total Reconstruction projects
		3. Protection-Driven	n/a	From GHD model, maintain a level of funding to keep SD percentage at 7%.				**$45m**	**$78m**	▪ Assumes Scenario 4 from the Total Reconstruction program ▪ No reduction taken for Total Reconstruction projects
Structures/Tunnels *Maintain facilities in a good state of repair and maintain a life cycle approach*	Recurring inspections and major rehabilitation projects	1. Performance-Driven	n/a	Routine maintenance & inspection	$100m	$5m/yr		**$40m**	**$2.5m**	▪ Includes Allegheny Tunnel bypass
				Tuscarora: FY18-20	$60m	$3m/yr				
				Blue-Kitt: FY21-24	$152m	$8m/yr				
				Allegheny Bypass	$400m	$20m/yr				
				Lehigh: FY24-25	$76m	$4m/yr				
		2. Protection-Driven	n/a	Routine maintenance& inspection	$100m	$5m/yr		**$25m**	**$2.5m**	▪ Does NOT include Allegheny Tunnel bypass
				Tuscarora: FY18-20	$60m	$3m/yr				
				Blue-Kitt: FY21-24	$152m	$8m/yr				

Major Category/ Strategic Driver	Assumptions	Scenario Description	Year Complete	Back-Up Calculations				Scenario Total Annual Average	FY16 10-Year Capital Plan Annual Average	Notes/Comments
				Unit	Unit Cost	Total	20-Yr Annual			
				Allegheny: FY26-29		$114m	$6m/yr			
				Lehigh: FY24-25		$76m	$4m/yr			
Interchanges *Increase mobility and reliability in travel time*	Address congestion and performance of interchanges	1. Performance-Driven	n/a	Basic preservation		$60m	$3m/yr	**$45m**	**$39m**	▪ Addresses congestion and performance of interchanges ▪ Assumes Cashless Tolling program continues ▪ Assume 7 major interchange projects (e.g., Monroeville, Valley Forge, etc.)
				I-95 Stage 1		$340m	$17m/yr			
				LaFayette Street I/C		$60m	$3m/yr			
				7 Int's	$60m/Int.	$420m	$21m/yr			
		2. Protection-Driven	n/a	Basic preservation		$60m	$3m/yr	**$25m**	**$39m**	▪ Basic system preservation ▪ Assumes Cashless Tolling program continues
				I-95 Stage 1		$340m	$17m/yr			
				LaFayette Street I/C		$60m	$3m/yr			

Source: Michael Baker International analysis



Appendix D: Review of Departments that Operate Under the Capital Plan

This appendix provides further discussion on the various departments that operate under the Capital Plan.

Engineering Department

The Engineering Department is responsible for implementing and maintaining the Highway Program of the Capital Plan. The Department has over 155 employees in Design and Construction, including 38 Professional Engineers. Projects included in the Highway Program are developed from asset management initiatives. The overall focus of the Engineering Department is to preserve and enhance the Pennsylvania Turnpike roadway system by planning, designing and constructing capital projects and to ensure that the Turnpike system is maintained commensurate with Interstate highway standards.

The Engineering Department developed nine Departmental Tactical Initiatives that include:

1. Capital Plan Management
2. Procurement of Professional Services
3. Accelerated Bridge Construction
4. Environmental Permit Management
5. Reorganization of Construction Department and Redefine Roles and Responsibilities of QA Unit
6. Construction Operations Manual and Design Operations Manual updates, development and training
7. Staff Development
8. GIS development
9. Tunnel Ceiling Slab Improvements

These Tactical Initiatives link directly to the PTC Strategic Plan through the “Infrastructure” and “Workforce” Strategic Drivers.

Traffic Engineering and Operations (TE&O) Department

The Traffic Engineering and Operations Department, which includes 25 management personnel, and 32 union personnel, has initiated a business planning process in order to assist it in addressing the challenges of the future. TE&O is responsible for a wide range of items relating to mobility and safety for all road users. The department is organized into four groups: Operations Center, Traffic Engineering, Traffic Operations, and Employee & Customer Safety. Every group within the department coordinates with PennDOT, PEMA, and FHWA on traffic, operations, and safety for emergency operations as needed.

The Operations Center is a combined emergency dispatch “911” center and a Traffic Management center combined into one facility for the entire roadway system. They handle a wide variety of calls related to incidents on the roadway. They dispatch fire, emergency medical services, state police, tow trucks, and hazardous materials response teams for customer involved in motor vehicle accidents, customers needing medical assistance, and customers requiring mechanical assistance for their vehicles. Staff of the Operations Center enters data into a Computer Aided Dispatch system that sends appropriate resources by recommendation of the location and incident type.

The Traffic Operations section is ultimately responsible for the mobility, accessibility, and reliability for motorists traveling along the turnpike. This section is responsible for evaluating mobility needs related to recurring and non-recurring congestion and for communicating operational performance to internal and external stakeholders. This includes a focus on operations throughout the system as it relates to work zone management, incident and emergency response and winter operations. It also oversees Traffic Incident Management and Emergency Management needs for the Turnpike as it relates to initiatives, training, and projects. This section coordinates the planning, design, and construction of the ITS technology infrastructure system-wide. In addition, they manage and coordinate projects based on needs associated with the Operations Center and Information Technology, and implement traffic management plans associated with construction projects. They coordinate planning with other agencies, including FHWA, PennDOT, MPOs, and other states.

The Traffic Engineering section provides support through the completion and/or review of a wide range of engineering studies and reports relating to traffic control, highway safety, traffic and revenue studies and traffic growth and forecasting. This section is responsible for the review and/or creation of contract specifications and plan standards dealing with the Maintenance and Protection of Traffic (MPT) during design and throughout the construction of the projects. In addition, support is provided to other Departments and sections through the review of crash data, conducting specific traffic counts, reviews and implements federal and state traffic and safety requirements, acts as a design and maintenance resource for all traffic signs and provides traffic engineering related information and responses to customer inquiries.

The Safety section objectives are two phased: 1) ensuring that all PTC employees have a safe and secure working environment and 2) providing a safe and secure travel environment by increased awareness of various Turnpike Safety Services available to their customers during their travels on the Pennsylvania Turnpike. This is accomplished through the development of safety and health procedures and safe work practices, controlling unsafe acts, unsafe conditions, and the occurrence of work-related accidents, along with minimizing employee injuries and other property losses. Safety Response personnel patrol and provide assistance to motorists and respond to various other incidents to maintain a free-flowing roadway. Additionally, they organize and conduct safety training programs to advise and instruct employees on proper safety practices. This department also oversees the daily operation of Authorized Services providers for its customers who experience a breakdown, run out of gas or need a tow while on the Turnpike.

The PTC has always taken ensuring the safety of motorists and workers very seriously and this goal takes on additional urgency in work zones, where the traveling public and workers come very close to each other. The PTC increased its outreach efforts with the launch of a marketing campaign at the start of the 2014 construction season to raise awareness of the importance of safety within its work zones.

In the TE&O Department Business Plan, the following key elements and challenges were identified:

- Improving roadway, customer, & employee safety

- Reducing the average incident duration
- Increasing the availability of travel information
- Improving mobility
- Improving workplace safety
- Reducing the number of employee injuries
- TIMS responder training
- Conducting after-incident reviews to improve operations
- Deploying ITS infrastructure

Maintenance Department

The Maintenance Department, which includes 81 Management personnel, 697 Union personnel, 22 maintenance facilities, 2 training sites and 5 tunnels, is responsible for maintaining 552 miles of roadway and nearly 2,646 lane miles from the Delaware River Bridge west to the Ohio state line. During the summer and spring months, major improvements are performed on the pavement, bridges, guiderails, medians, and shoulders. Line painting, mowing, litter cleanup and patching are also maintenance activities routinely done during these seasons. Throughout winter months, special shifts are assigned to address snow and ice 24 hours a day, seven days a week. Trained crews maintain the Turnpike throughout the year at an annual labor cost of approximately $32 million. Maintenance personnel use approximately 3,444 different pieces of equipment to maintain the Turnpike's roadway and bridges.[21]

Maintenance is likely to have a significant number of key management staff retiring over the next two to five years

In the Maintenance Department Business Plan, key elements and challenges were identified. Specifically, there was a renewed focus on developing maintenance crew productivity standards and a desire to increase customer service standards by expanding the Maintenance Utility Worker (MUW) program. An analysis of current staffing years of service revealed there is likely to be a significant number of key management staff retiring over the next two to five years. This creates a serious challenge and necessitates a sense of urgency to make certain there is a transfer of institutional knowledge.

Facilities & Energy Management Operations (FEMO) Department

The FEMO Department, which includes 29 Management personnel and 86 Union personnel, is responsible for overseeing the PTC's facilities. The facilities include the Central Administration Building (CAB), Turnpike Industrial Park (TIP) Building, the Eastern and Western Regional Offices (ERO/WRO), 17 service plazas, 22 maintenance facilities, 5 tunnels, 2 training sites, 11 salt storage facilities, as well as 67 fare collection facilities and 8 State Police stations. FEMO accounts for approximately 3.6 percent of the proposed FY16 10-Year Capital Plan in the amount of $21.9 million, and can be organized into five categories as follows:

- **Sustainment** - this category is used for preventative maintenance (pm), preventative maintenance contracts, unplanned maintenance needs (emergencies), renovation projects, and general improvements to PTC facilities.

[21] It should be noted that "maintenance" costs are treated as operating costs (as opposed to capital), except for fleet purchases, which are part of the Capital Plan.

- **Compliance** - this category is used for maintaining compliance with current environmental regulations.
- **Re-Capitalization** - this category is used for addressing deficiencies in communication towers, or for the construction of new salt storage buildings, or other significant improvements to facilities.
- **New Energy Initiatives** - this category is used for initiating and funding new lighting upgrades, energy audits and energy account analysis, and building assessments.
- **Facilities Design** - this category is used for the design and construction of updating and improving existing PTC facilities and the design and construction of new facilities.

Information Technology (IT) Department

Technology is the driving force [or backbone] of nearly every business improvement initiative the PTC undertakes. The PTC's Information Technology Department seeks to develop and deliver innovative, flexible, and cost-effective solutions that support the PTC's mission and goals. The IT Department is responsible for the development of technical standards and procedures governing all information and operational technology (IT/OT) investments within the PTC. This supports an enterprise approach to IT/OT, which maximizes the value of technology investments, ensures technical interoperability, promotes information security, and reduces functional duplication. Aware of the important relationship between data compilation, management and distribution, the IT Department incorporates four vital groups:

- Enterprise Solution and Support Group
- Technology Infrastructure
- Information Security
- Network Operations and Control

A few highlights of the Department's recent work are as follows:

Communications Modernization – The PTC has a mobile workforce which needs to be supported. The Department has advanced an initiative to put work orders on a tablet to minimize data entry errors. The technology allows information to get into workers' hands more quickly than before. The Department has also successfully transitioned the PTC's administrative offices from an aging telephone-based system to a state-of-the-art Voice Over Internet Protocol (VOIP) solution. This provides new and powerful capabilities that improve operational efficiencies by providing integrated video, voice, instant messaging and voice-mail with the desktop and Outlook.

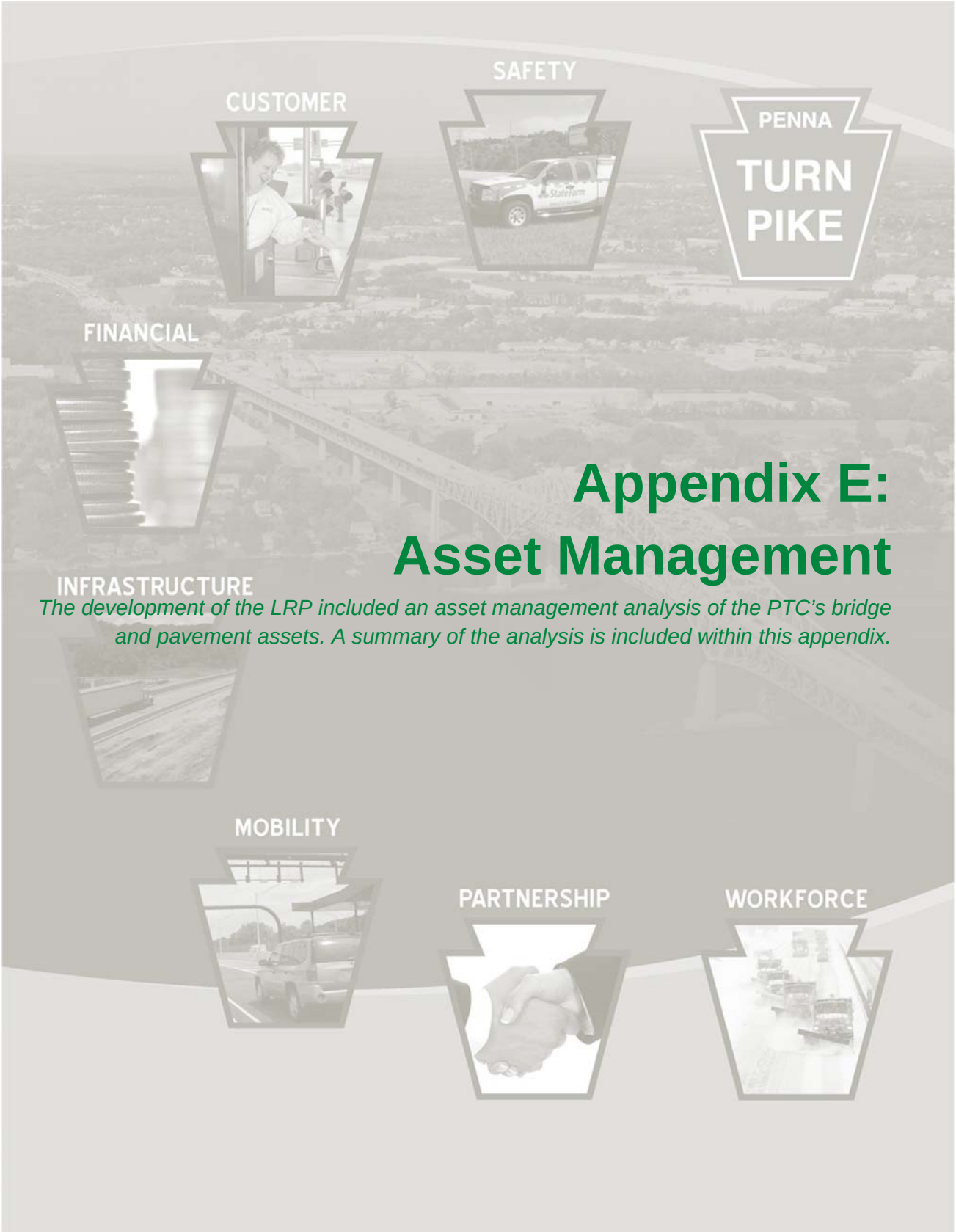
SAP Business Enhancements – The successful Linear Asset Management (LAM) project has greatly improved the ability of the Maintenance Department to plan, monitor, and report on work activities. The IT Department has also enhanced SAP to allow the implementation of Alternate Work Schedules (AWS) and support the implementation of Agility Agreements with PennDOT.

Mobile Workforce Enablement – The initial deployment of a mobile application for use by FEMO was deemed successful and other areas for application will be evaluated. The application has allowed for supervisors to receive notifications of work to be done and assign

that work to employees through a work order. When the work is completed, the information is uploaded directly into SAP and catalogued. The application has reduced paperwork and sped up quantity tracking in SAP for a more up-to-date status. This effort will be evaluated in other departments to determine where it can be beneficial and enhance the tracking and completion of work.

Security Improvements – Security is a fundamental long-range need, as threat vectors are constantly changing. The PTC could face possible negative impacts if it fails to address security threats to its infrastructure. Therefore, the Department implemented a monitoring tool that detects unauthorized access to e-mail accounts or file shares to improve data security. It has also taken responsibility for the Video Management System (VMS), maintenance, and support of roadway and security cameras throughout the system as it begins its effort to enhance operations technology security.

There is also an increasing need for sensors and IOT (Internet of Things), resulting in advanced analytics and autonomous business operations supported by machine learning that supports traffic operations and incident response. There is also a need for fiber in the roadway and a wireless mesh overlay to support connectivity that will support all of these, as well as other elements, such as connected vehicles and cashless tolling.



Appendix E: Asset Management

The development of the LRP included an asset management analysis of the PTC's bridge and pavement assets. A summary of the analysis is included within this appendix.

Transportation asset management is a strategic framework for making cost-effective decisions about allocating resources and managing infrastructure. It is based on a process of monitoring the physical condition and performance of the PTC's assets, forecasting deterioration over time and providing information on how to invest in order to maintain or enhance the performance of assets over their useful life.

The goal of a transportation asset management program is to optimize the balance between service costs and the level of service being provided to customers using the PTC's transportation assets including pavements, bridges, tunnels, intelligent transportation systems and modernization of public facilities and equipment. Asset management analysis is aligned with the PTC's strategic goals to enable a line of sight between financial goals and infrastructure investment needs, and provides a strategic thinking framework that supports the achievement of those goals.

While asset management techniques were introduced into the production of this update of the LRP, there are a number of areas where asset management practice could be improved or developed further to meet the goal of optimization of capital and operational cost needs. These areas include:

- Business processes related to asset life expectancy cost determination
- Business processes related to monitoring asset deterioration and linking treatment options to condition states
- Information technology systems and governance as they relate to asset management practices
- Integrating asset management principles more fully into capital programming and project planning
- Tracking maintenance work activities to determine their effect on asset life expectancy costs
- Business processes related to linking the cost of service to levels of service

Asset Management in Context of the Long Range Plan

Asset management principles were used to perform predictive modeling for both bridge and pavement assets as a separate analytical exercise in the development of the Long Range Plan. The purpose of this work was to support the validation of other planning analysis and, ultimately, incorporate it into the traditional planning process and the recommendations contained in this plan. As asset management practices advance at the PTC, this portion of the LRP may evolve into a standalone Transportation Asset Management Plan and an alternative Strategic Asset Management Planning chapter in the LRP document.

Also as part of the LRP update, the PTC's existing asset management systems were identified and evaluated. A summary of the evaluation follows in **Table E-1**.

Table E-1: Summary of the PTC's Existing Asset Management Systems

System	Stakeholders	Observations	Recommendations
Agile Assets	▪ N/A	This is a platform that has not been implemented yet but may be used for various asset management components	PTC should continue to pursue an agreement to develop this system
ONEDOT	▪ Engineering ▪ FEMO ▪ Maintenance ▪ Facilities	Requires manual data input; system lacks functionality for querying the assets based on condition	PTC should improve the functionality of its system to meet the requirements of federal inspection policies and improve the overall capability of future work projection
Major Guide Sign Inventory	▪ Customer Service ▪ Engineering ▪ TE&O	System does not have any financial analysis or performance management capability; requires manual data input	Use Agile Assets to manage sign assets moving forward
PAMS	▪ N/A	This has not been launched; PAMS will interface with SAP to enable a better understanding of work and material costs	PTC must fully develop its pavement categories before PAMS can be fully utilized
Pontis	▪ Engineering ▪ CAC	Inventory dataset for bridge assets; reported to PennDOT for use in its BMS database; high level of confidence in this data	Begin collecting bridge condition data at an elemental level in April 2016; connect Pontis to a permit management system to improve efficiencies
SAP	▪ Engineering ▪ FEMO ▪ Maintenance	Concerns with data quality; data collection methods need to be standardized	PTC should begin to develop processes to promote the sharing of information and joint data ownership
Service Now	▪ Technology	Wide range of functionality – can send routine maintenance notifications for assets	PTC should continue to develop this system

Source: GHD Group

Bridge Asset Management Analysis

The PTC manages more than 800 bridges and culverts.

Table E-2 shows the bridge and culvert structurally deficient inventory by count and deck area. Currently, 4.5 percent of Commission bridges are structurally deficient. There are currently no structurally deficient culverts in the network.

Table E-2: Bridge and Culvert Inventory

	Count	Deck Area (sf)	Structurally Deficient by Count	Structurally Deficient by Deck Area
Bridges	728	9,864,974	38 (5%)	417,884 (4%)
Culverts	138	317,127	0	0
Total	866	10,182,101	38 (5%)	38 (5%)

The Bridge structures in the network were classified into three material groupings based on construction design: prestressed (P/S), steel (STL), and concrete (CONC). Around 70 percent of the bridges are classified as STL. Each material group was assigned specific bridge deterioration curves based on analysis of condition decay in bridges in Pennsylvania. A separate curve was used for the deck, superstructure, substructure, and culvert condition score. **Table E-3** shows the breakdown of bridges by material type.

Table E-3: Bridge Classification by Material

Bridge Type	Count	Deck Area
P/S	91	898,779
STL	507	8,561,306
CONC	130	404,888

Condition and Performance Classification

Bridge condition is evaluated for the deck, substructure, and superstructure while culverts are evaluated on a single culvert condition score. Bridge condition is scored from one to nine where nine is classified as new condition and less than or equal to four is classified as structurally deficient.

Condition and Performance Goals

PTC uses performance goals to establish the criteria to be used in making investment decisions to meet the overall asset management strategy. Both performance and condition goals are based on maintaining the current low percentage of structurally deficient bridges in the network.

The following performance measures as depicted in **Table E-4** were used in bridge and culvert condition assessment.

Table E-4: Bridge and Culverts Performance Measures

Measure	Description	Goal
SD Condition, Percentage of Structurally Deficient Deck Area	Measure the percentage of bridge deck area that is structurally deficient	The goal for PTC is to keep percent for SD by deck area below 4.5%
SD Condition, Number of Structurally Deficient Bridges	Measure the number of bridges that are structurally deficient	The goal for PTC is to keep number of SD structures below 4.5%

Bridge Lifecycle Cost Considerations

An asset's lifecycle cost is the total expense associated with the asset for the duration of its life, including all rehabilitation procedures it undergoes. **Table E-5** and **Table E-6** show the recommended rehabilitation cost schedule for the bridges and culverts, respectively. Bridge assets are on a 20-year rehabilitation cycle, while culvert assets are on a 25-year rehabilitation cycle. Note that the rehabilitations are significantly simplified to allow for the high level system performance modeling. In reality there is significantly more variation in bridge rehabilitation and life cycle cost.

Each rehabilitation has a positive effect on the condition of the bridge in a given model year. Bridge condition is also decayed each year in the model to indicate the aging of bridge assets. A bridge is assumed to have a life of 100 years before it becomes structurally deficient, when sufficient funding for required rehabilitations is available in the model scenario. When funding is insufficient, a bridge will continue to decay and become structurally deficient before the end of its 100-year life.

The cost of each rehabilitation and replacement is based on a fully loaded per square foot bridge construction cost and roadway construction cost. The roadway construction cost represents the cost of grading and repaving the approaches on both ends of the bridge. All costs are based on PTC current practice.

Table E-5: Bridge Rehabilitation Cost Schedule[22]

Year Applied	Rehabilitation	Fully Loaded Cost	
		Structure ($/SF)	Roadway ($/EA)
20	Minor Bridge Rehabilitation	$71	$254,300
40	Deck Replacement	$143	$254,300
60	Major Superstructure Rehabilitation	$128	$254,300
N/A	Superstructure Replacement[23]	$199	$385,434
80	Minor Bridge Rehabilitation	$71	$254,300
100	Bridge Replacement	$370	$777,389

Table E-6: Culvert Rehabilitation Cost Schedule[24]

Year Applied	Rehabilitation	Fully Loaded Cost	
		Structure ($/SF)	Roadway ($/EA)
25	Culvert Rehabilitation	$71	$254,300
50	Culvert Rehabilitation	$71	$254,300
75	Culvert Rehabilitation	$71	$254,300
100	Culvert Replacement	$370	$777,389

Future Bridge Network Needs

A number of modelling scenarios were run to help determine future network needs. Model runs included half of the deck area for the Delaware River Bridge, which is the share for which the PTC is responsible.

Unconstrained Scenario

An estimate of yearly future bridge needs is based on an unconstrained forecasting model. The following assumptions were made to assess the future bridge network for the unconstrained scenario:

[22] The rehabilitation cost schedules are a generalization for the purposes of modelling the performance of all bridges over time. The purpose of the modelling is to provide system level predictions which this schedule reasonably allows for.

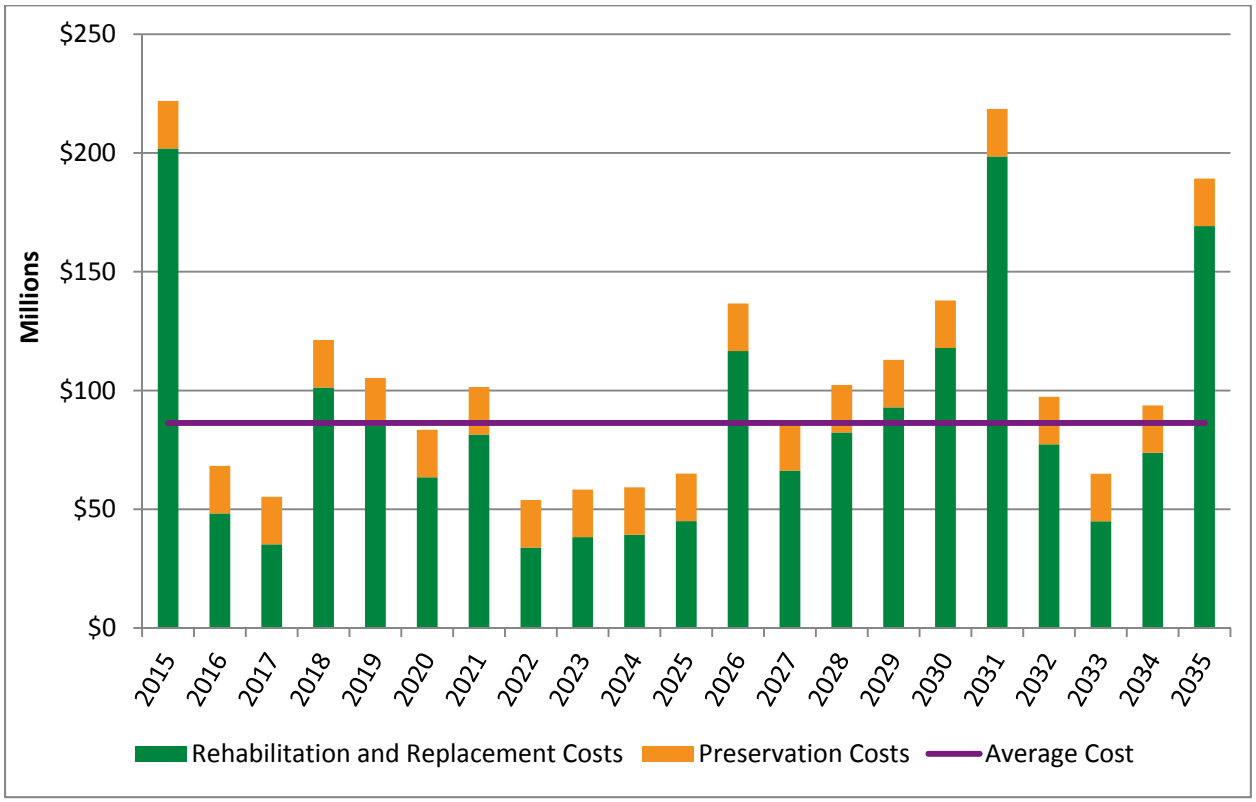
[23] Superstructure replacement is not part of the regular lifecycle cost schedule for bridges. The superstructure replacement is only called by the model when the superstructure condition is especially poor.

[24] Superstructure replacement is not part of the regular lifecycle cost schedule for bridges. The superstructure replacement is only called by the model when the superstructure condition is especially poor.

- 20-year analysis period is considered.
- There is no annual budget limit. Therefore, all necessary bridge rehabilitation and replacement is performed as required, without consideration of funding limitations.
- All bridges are divided highway.
- For bridges without deck area information, the deck area was estimated.
- The budget keeps pace with inflation using 2015 dollars.
- The model is intended to provide network-level results rather than individual project level results.
- The model prioritizes work on SD bridges over all other bridge rehabilitation. This is not necessarily the best asset management practice or lowest life cycle cost.
- The model's deterioration rates assume that preservation activities like bridge painting and washing are preformed routinely. These costs are estimated at $20M/yr.

Figure E-1 shows the future rehabilitation and replacement investment needs for the PTC bridges and culverts network. The total expenditure projected by the model for PTC bridges and culverts over the next 20 years is $1.8 billion. **This translates to an average annual expenditure of $86 million.**

Figure E-1: 20-Year Renewal and Preservation Planning



Constrained Scenarios

In addition to the unconstrained scenario, three constrained funding scenarios were designed to forecast the bridge and culvert network performance when the available budget is less than estimated needs. These scenarios are shown in **Table E-7**. All assumptions are valid except that the budget is limited in each scenario to the annual funding amount shown in **Table E-7**.

Each funding scenario also assumes bridge preservation funding of $20 million dollars per year to pay for activities such as bridge painting. This preservation funding is in addition to the bridge rehabilitation and replacement costs assumed in each scenario.

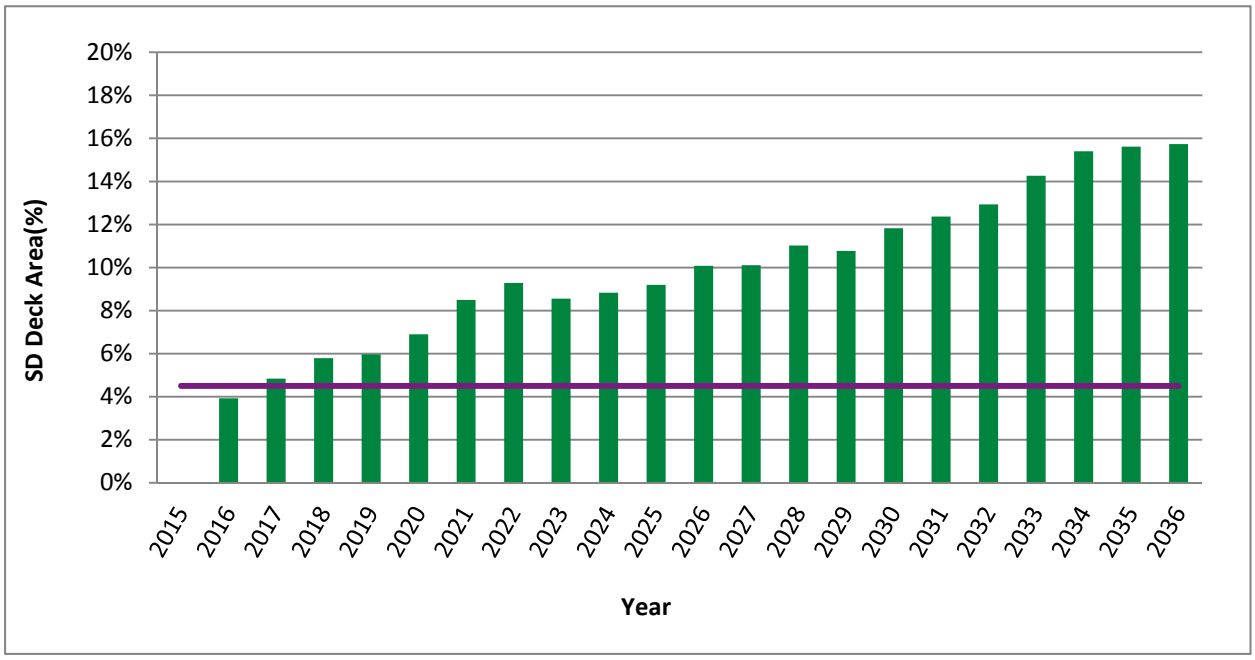
Table E-7: Funding Scenarios

Scenario	Funding
Scenario 1	$30 M/year
Scenario 2	$45 M/year
Scenario 3	$60 M/year
Unconstrained needs	$86 M/year

Scenario 1- $30 Million per Year

The annual budget in Scenario 1 is limited to $30 million per year. The condition profile shows that the overall network condition will deteriorate significantly over the next 20 years **(Figure E-2)**. The $30 million per year investment is insufficient to meet the performance goals and results in a drastic increase in structurally deficient bridges and culverts.

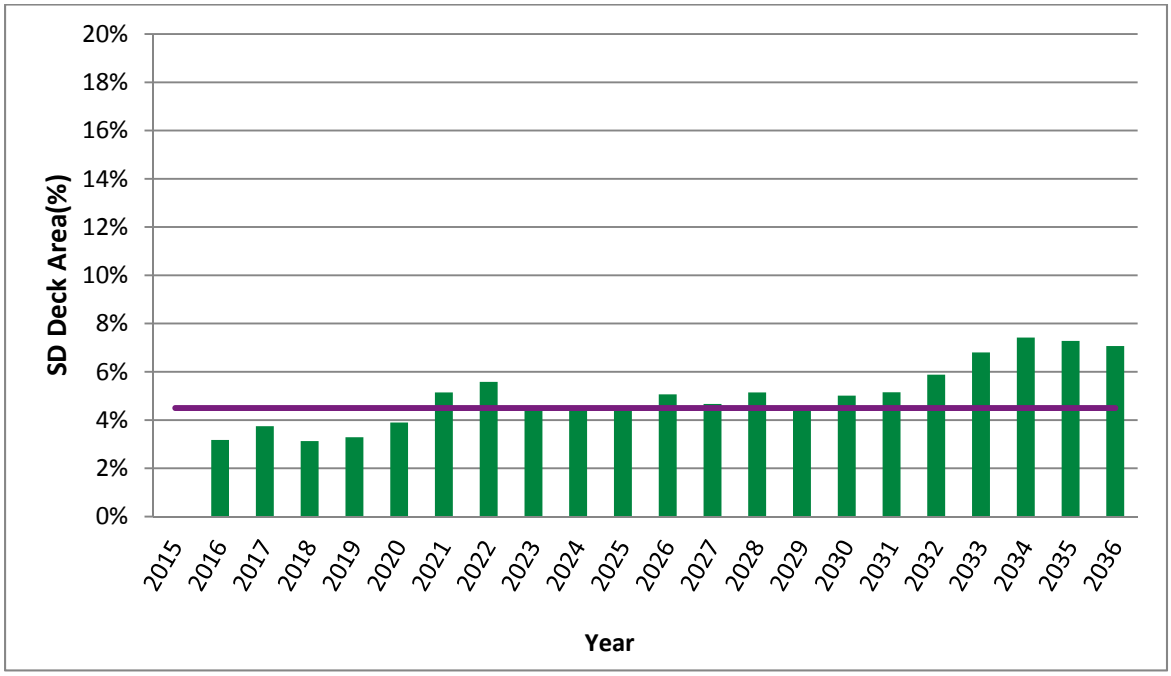
Figure E-2: Network Condition Forecast in Scenario 1- $30 M/yr



Scenario 2- $45 Million per Year

The annual available budget in Scenario 2 is $45 million per year. The condition profile shows that the overall network condition will gradually deteriorate over the next 20 years (**Figure E-3**). The $45 million per year investment is also not sufficient to meet the performance goals particularly in the long term and results in more structurally deficient structures.

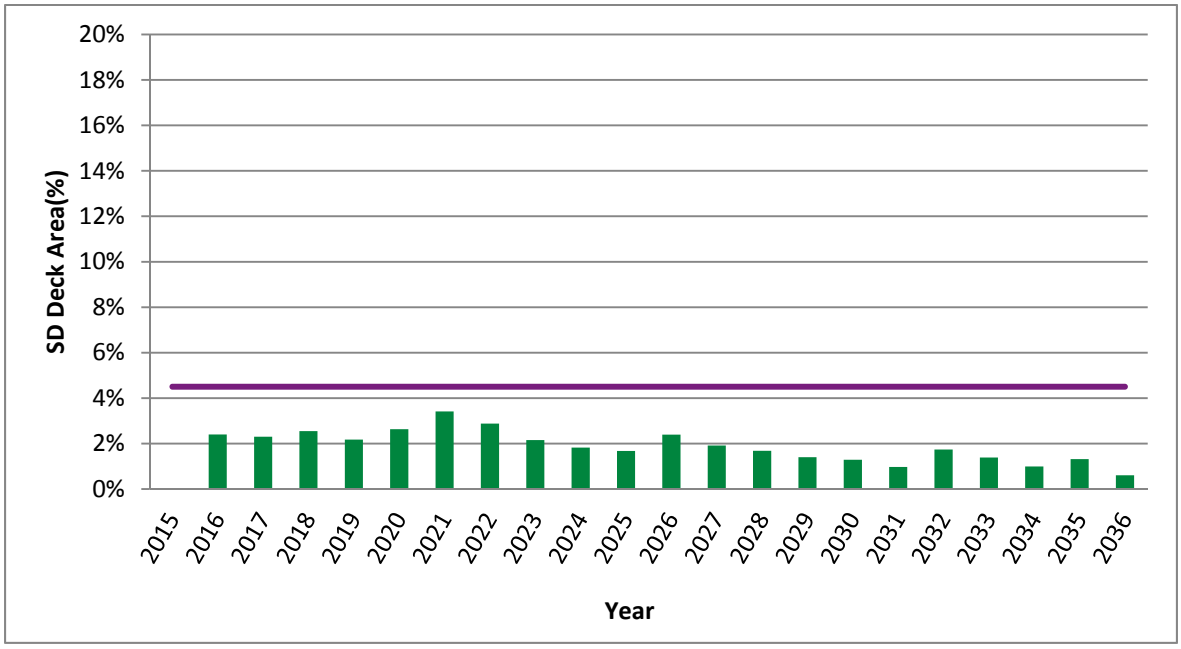
Figure E-3: Network Condition Forecast in Scenario 2- $45 M/yr.



Scenario 3- $60 Million per Year

The annual budget is $60 million per year in Scenario 3. The condition profile shows that in Scenario 3 the overall network condition will improve over the next 20 years (**Figure E-4**). The $60 million per year investment is sufficient to meet the performance goals and results in a significant decrease in SD structures as well as overall network condition improvement.

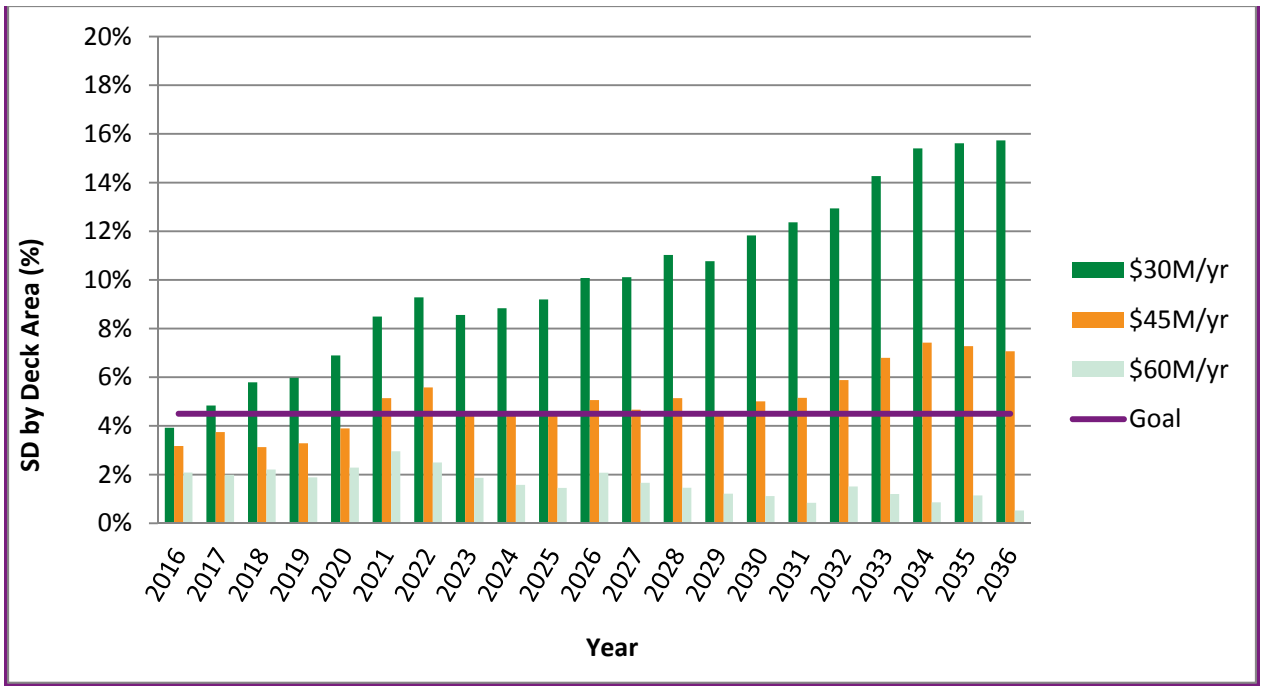
Figure E-4: Network Condition Forecast in Scenario 3- $60 M/yr



Conclusions

The network condition forecast is compared for all three scenarios below in **Figure E-5**. This figure shows that the middle scenario ($45M/yr.) is most near the funding level required to maintain the performance goal of 4.5 percent. This analysis also illustrates a common trend in asset forecasting: once funding drops below a certain level (e.g., the $30M/yr. scenario) the network deteriorates faster than it can be renewed causing significant deterioration over time.

Figure E-5: Constrained Scenarios



Pavement Asset Management Analysis

The PTC manages 552 center-line miles (approximately 1,700 lane miles) of pavements in both the west bound and east bound direction. PTC pavements are managed in 100 segments with an average age of 63 years (see **Table E-8**).

Table E-8: Pavement Inventory

	# of Segments	Length (miles)	Average age (Years)
Pavements EB(NB)	100	552 (1653 lane miles)	63
Pavements WB(SB)	100	552 (1653 lane miles)	63

Condition and Performance Classification

The PTC uses the International Roughness Index (IRI) and Pavement Condition Rating (PCR) as the primary pavement condition and performance measures. IRI is based on the smoothness of the pavement while PCR combines a number of pavement factors including IRI to provide a more holistic measure of pavement performance.

Table E-9 and **Table E-10** provide an example of classification of pavement segments into categories of excellent, good, fair, and poor condition. These tables are used by the Pennsylvania Department of Transportation (PennDOT) and provide a good baseline for defining pavement condition bands in this analysis. The primary performance goals used are based on the percentage of roadway miles that fall into these categories.

Table E-9: PennDOT's IRI Classification, by Business Plan Network[25]

IRI Ranges (inches per mile)	National Highway System (NHS)		Non - National Highway System	
	Interstate	Non-Interstate	ADT ≥ 2000	ADT < 2000
≤ 70	Excellent	Excellent	Excellent	Excellent
71-75	Good			
76-100		Good		
101-120	Fair		Good	
121-150		Fair		Good
151-170	Poor		Fair	
171-195		Poor		Fair
196-220			Poor	
> 220				Poor

[25] Source: PennDOT 2011 Performance Measures Guide for Bridge and Pavement Annual Report

Table E-10: PCR Classification by Business Plan Network[26]

Category	National Highway System (NHS)		Non-National Highway System	
	Interstate	Non-Interstate	ADT ≥ 2000	ADT < 2000
> 95	Excellent	Excellent	Excellent	Excellent
91-95	Good	Good		
86-90			Good	
81-85	Fair			Good
76-80		Fair	Fair	
71-75	Poor			
66-70		Poor		Fair
60-65			Poor	
< 60				Poor

Existing Condition and Performance

Although PTC pavements have reached their end of life on average (average age of 63 years), they are in good condition with average IRI of 81 and average PCR of 92. This is due to frequent maintenance and rehabilitation treatments that have improved the surface conditions of roadways.

Table E-11: Existing Pavement Condition and Performance

	Miles	Average IRI	Average PCR	Average Life (Yrs)
Pavements EB (NB)	552 (1,653 lane miles)	82	92	63
Pavements WB (SB)	552 (1,653 lane miles)	80	92	63

Pavement Lifecycle Cost Considerations

An asset's lifecycle cost is the total cost over the duration of its life, including all rehabilitation procedures it undergoes. In order to model cases where no rehabilitation is done due to lack of funding, each segment of pavement is assumed to have a 30-year lifecycle. For cases where funding is available, an ideal replacement and rehabilitation cost schedule has been developed to dictate the recommended replacement or rehabilitation action for an asset based on its age. **Table E-12** shows the recommended rehabilitation cost and schedule for pavement assets. Costs include design and construction multipliers.

[26] Source: PennDOT 2011 Performance Measures Guide for Bridge and Pavement Annual Report – this classification was originally developed for OPI but adopted for PCR in this study.

Table E-12: Pavement Rehabilitation Cost Schedule

Year Applied	Treatment	Cost per mile (6 lanes)
0	NEW PAVEMENT	$12,000,000
2	Clean and Seal joints + Crack sealing	$6,400
4	Clean and Seal joints + Crack sealing	$6,400
7	Open End Work	$40,000
8	Clean and Seal joints + Crack sealing	$6,400
10	Open End Work & Crack Sealing	$50,000
12	Clean and Seal joints + Crack sealing	$6,400
14	2" MILL AND FILL ① + 2% patching + Seal shoulders	$1,000,000
16	Clean and Seal joints + Crack sealing	$6,400
18	Clean and Seal joints + Crack sealing	$6,400
21	Open End Work	$40,000
22	Clean and Seal joints + Crack sealing	$6,400
24	Open End Work & Crack Sealing	$50,000
26	2" MILL AND FILL ② + 2% patching + mill and Pave shoulders - OTHER Repairs	$1,200,000
28	Clean and Seal joints + Crack sealing	$6,400
30	Clean and Seal joints + Crack sealing	$6,400
33	Open End Work	$55,000
34	Clean and Seal joints + Crack sealing	$6,400
36	Open End Work & Crack Sealing	$65,000
38	5" MILL AND FILL ③ + 4% patching + Seal Shoulders - OTHER REHAB	$1,600,000
40	Clean and Seal joints + Crack sealing	$6,400
42	Clean and Seal joints + Crack sealing	$6,400
43	Open End Work	$55,000
44	Clean and Seal joints + Crack sealing	$6,400
46	Open End Work & Crack Sealing	$65,000
48	2" MILL AND FILL ④ + 4% patching + Reconst/M & P Shoulders - OTHER REHAB	$1,200,000
50	Clean and Seal joints + Crack sealing	$6,400
52	Clean and Seal joints + Crack sealing	$6,400
53	Open End Work	$55,000
54	Open End Work & Crack Sealing	$65,000
56	5" MILL AND FILL ⑤ + 6% patching + Seal shoulders - OTHER REHAB	$1,800,000
58	Clean and Seal joints + Crack sealing	$6,400
60	Open End Work	$55,000
61	Open End Work & Crack Sealing	$65,000
63	NEW PAVEMENT	

Future Pavement Network Needs

Turnpike pavements have reached the end of their 63 year life on average but have good surface conditions. Therefore, we have proposed two scenarios to assess pavement needs:

- Scenario 1- Age-based approach: in this scenario, pavements that reach their end of life based on age are replaced regardless of their IRI or PCR rating.

- Scenario-2- Condition-based approach: pavements will be replaced only if they have reached the end of their lifecycle and are in bad condition.

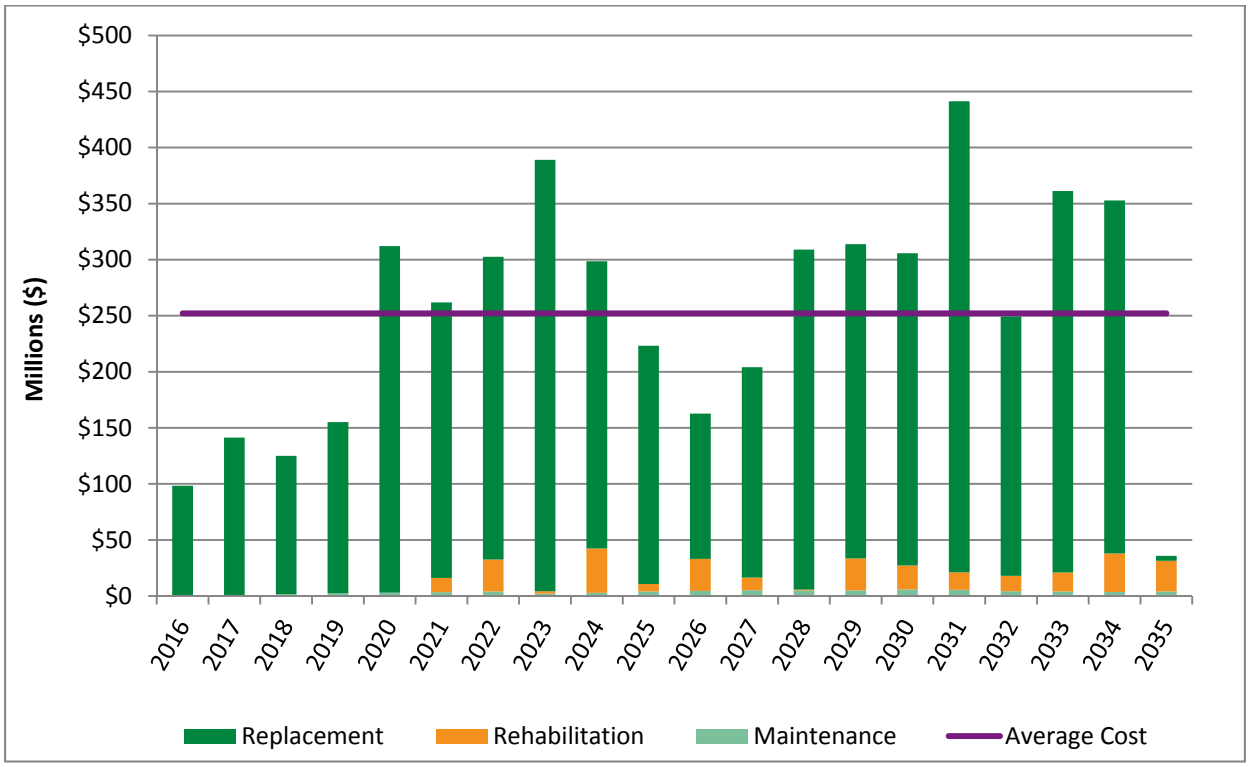
The following assumptions were made to assess pavement needs in both scenarios:

- Analysis period is 20 years.
- There is no annual budget limit. Therefore, all necessary pavement rehabilitation and replacements are performed as required, without consideration of funding limitations.

Scenario 1- Age-based Approach

Figure E-6 shows the future rehabilitation and replacement investment needs for Turnpike pavement in Scenario 1 where the pavements will be replaced if they reach the end of their life based on age. The total expenditure projected by the model for PTC pavement over the next 20 years is $5.04 billion. This translates to an average annual expenditure of $250 million.

Figure E-6: Capital and O&M Planning (Age-based Scenario)



Pavements are kept in excellent condition in this scenario because the majority of the network is replaced over the planning period.

Scenario 2- Condition-based Approach

Figure E-7 shows the future rehabilitation and replacement investment needs for the PTC pavement in Scenario 2 where the pavements will be replaced if they reach the end of their life based on age and are also in poor condition. The total expenditure projected by the model for PTC pavement over the next 20 years is $1.06 billion. This translates to an average annual expenditure of $50 million.

Figure E-7: Capital and O&M Planning (Condition-based Scenario)

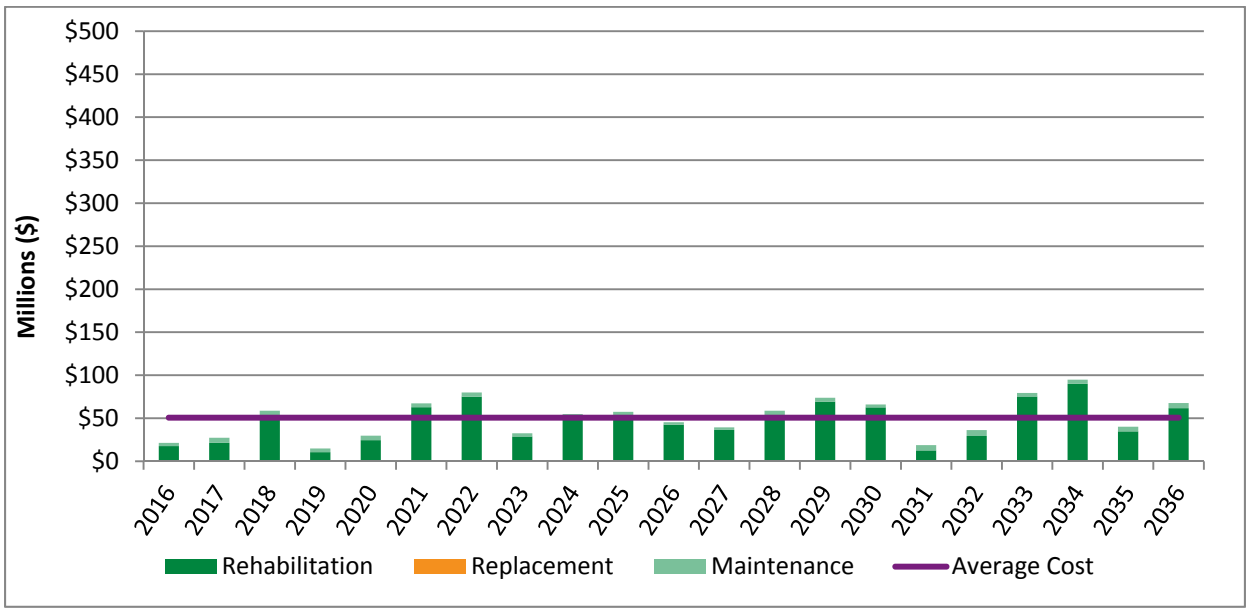


Figure E-8 and **Figure E-9** show the pavement condition profile with respect to IRI and PCR for the next 20 years. The results show that pavements are kept in acceptable condition with cyclic rehabilitation and maintenance.

Figure E-8: Scenario 2 Pavement Condition Profile (PCR)

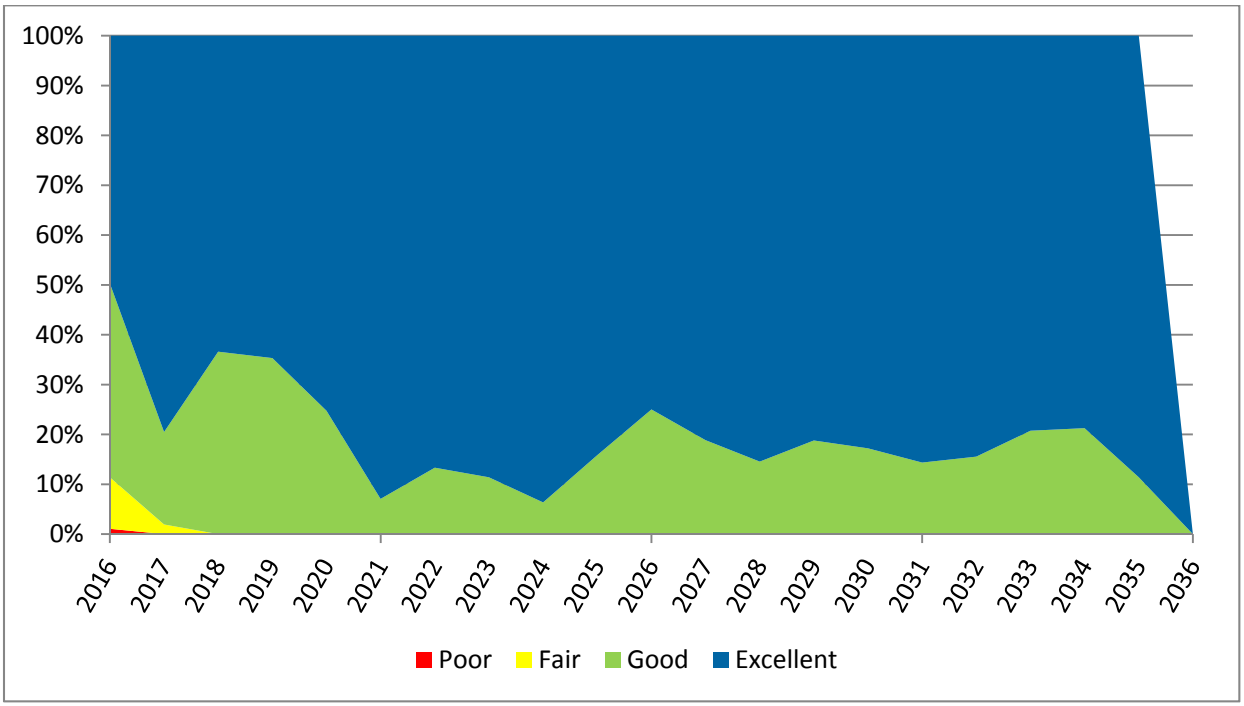
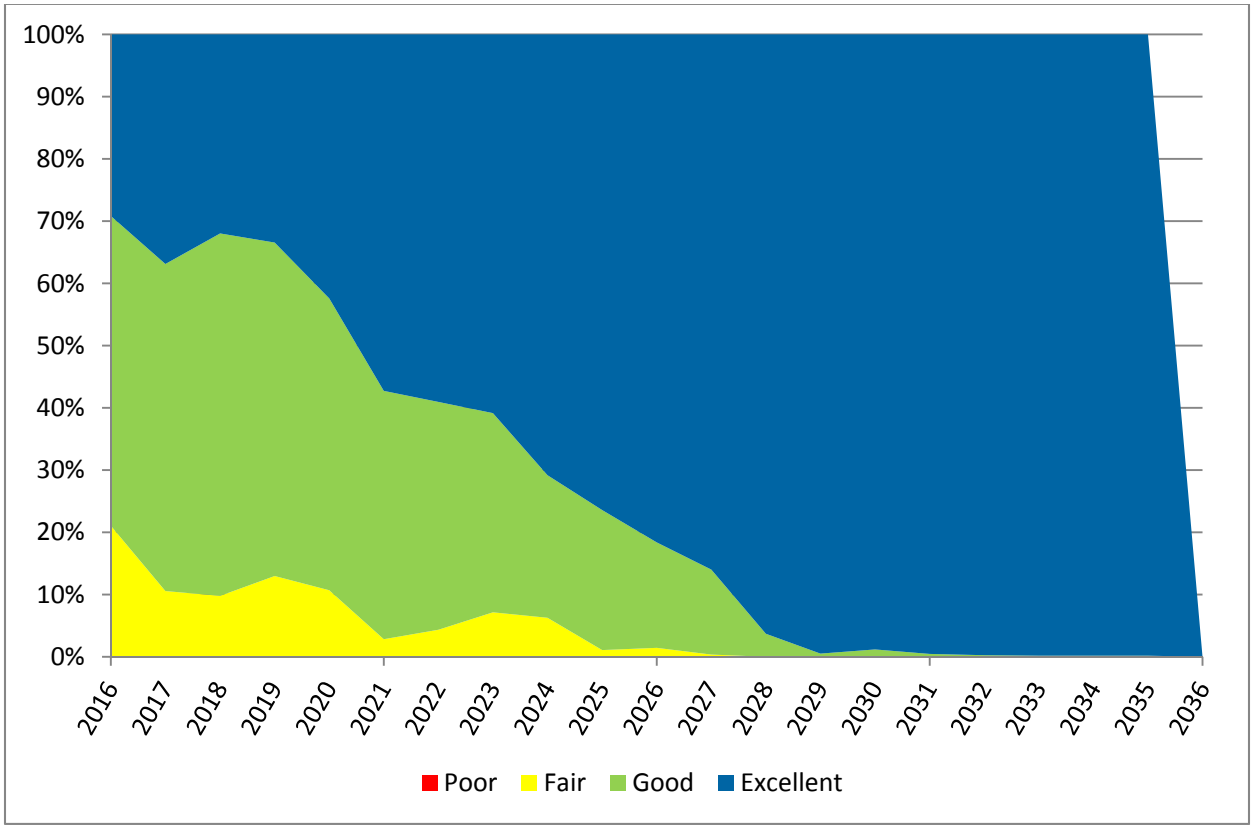
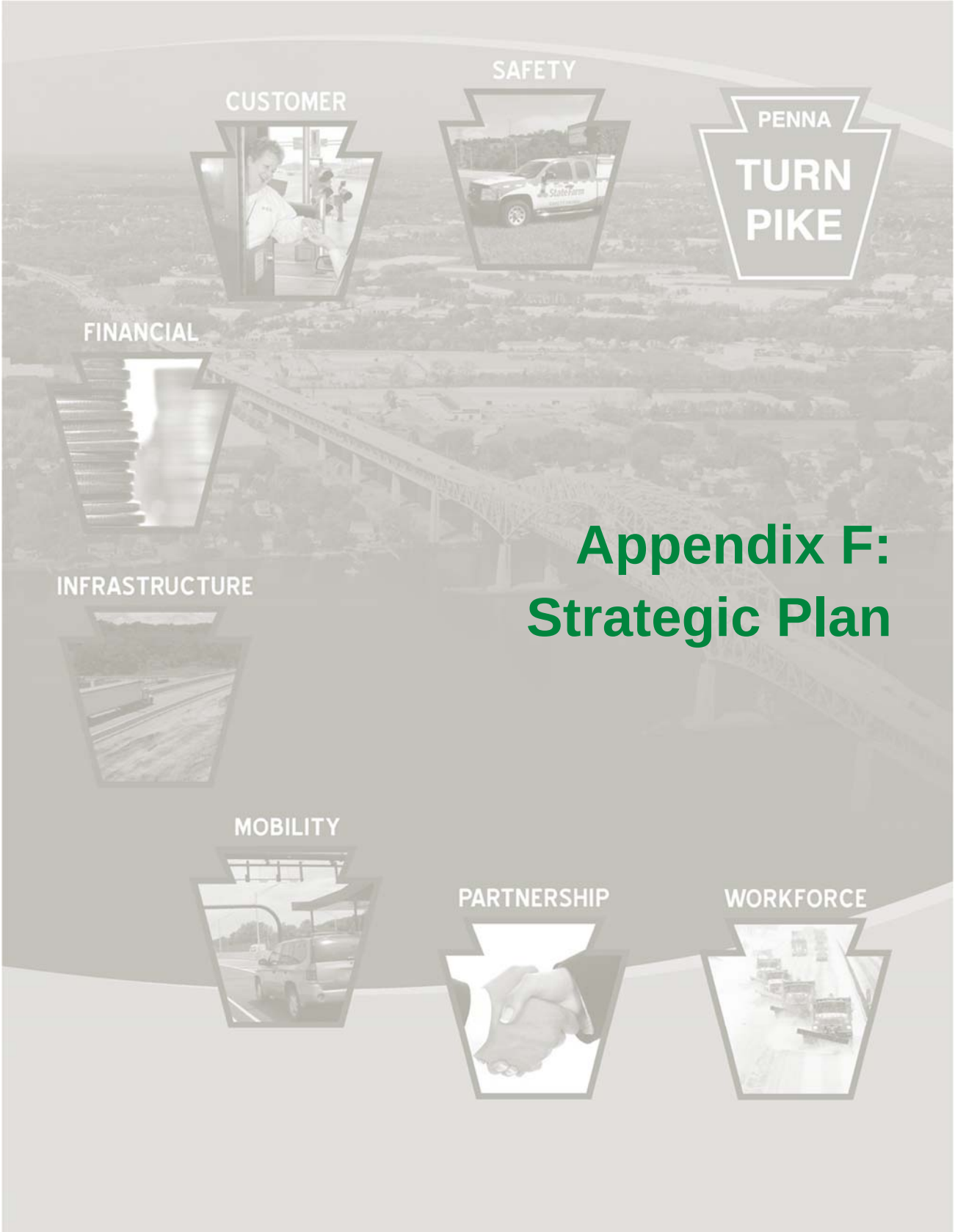


Figure E-9: Scenario 2 Pavement Condition Profile (IRI)



Conclusions

The two scenarios illustrate significantly different costs ($250 M/yr. vs $50 M/yr.) for similar levels of good to excellent service over the planning period. The reason for this difference is that it is unknown how long pavements can be maintained on the standard lifecycle without full replacement. Future improvements to asset decay analysis and effect of treatment should help to clarify this challenge. It should also be considered that replacement is often a better choice when considering other factors such as capacity and maintenance of traffic which were not considered in this analysis.



Appendix F: Strategic Plan

OUR MISSION

To operate a safe, reliable, customer-valued toll road system that supports national mobility and commerce.

PENNA TURN PIKE

Prepared for:
Pennsylvania Turnpike Commission

April 2014
AMENDED May 2016

Originally Prepared by:
McCormick Taylor, Inc. and Shelly Communications

Updated in coordination with:
Michael Baker International and
Quest Corporation of America (QCA)

OUR VISION

In serving our customers, we will reaffirm ourselves as the world's finest superhighway by:

- Fulfilling our public responsibility to provide a safe, sustainable, uninterrupted travel experience
- Becoming an industry leader, a valued business partner, and a trusted employer

Amended May 2016

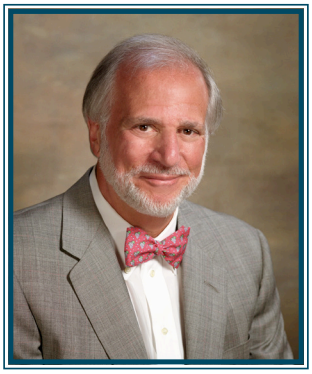
DRIVING TOWARD SUCCESS

TABLE OF CONTENTS

OUR PENNSYLVANIA TURNPIKE COMMISSIONERS

The Strategic Planning process began under the guidance of our Commissioners, who recognized the need for a comprehensive blueprint that would help our team move the Turnpike forward. Our Commissioners recognized that while this plan would be used to guide the actions of our entire workforce the focus throughout the process must remain on our customers.

Sean Logan
Chairman



William K. Lieberman
Vice-Chairman

Pasquale T. (Pat) Deon Sr.
Secretary-Treasurer

Barry T. Drew
Commissioner

Leslie S. Richards
State Transportation Secretary

Amended May 2016

OUR EXECUTIVE MANAGEMENT TEAM

CEO Mark Compton established the Executive Management Team (EMT) comprised of key leaders from each Department to lead this planning process. The consummate professionals listed below worked tirelessly and thoughtfully through a collaborative, facilitated planning process which included gathering feedback from their Departments to develop this 2016 Strategic Plan, which sets the course for our future direction.

Mark P. Compton
Chief
Executive Officer

Craig R. Shuey
Chief
Operating Officer

Doreen A. McCall
Chief Counsel

Charles Duncan III
Director of Legislative Affairs

Dale Hall
Director of Maintenance

Myneca Y. Ojo
Director of Diversity and Inclusion

Carl DeFebo Jr.
Director of Public Relations & Marketing

Ray Morrow
Chief
Compliance Officer

Stacia A. Ritter
Director of Policy and External Affairs

John D. (Jack) Christensen
Director of Facilities & Energy Management Operations

Nikolaus H. Grieshaber
Chief Financial Officer

Timothy M. Scanlon, P.E.
Director of Traffic Engineering and Operations

Robert Brady
Director of Operations/ Projects - East

Bradley J. Heigel, P.E.
Chief Engineer

Sheri Norris
Director of Human Resources

Scott D. Fairholm
Chief
Information Officer

Jeffrey L. Hess
Director of Fare Collection and Field Operations

Joseph W. Sutor, P.E.
Planning Manager
(Project Manager)




OUR AMENDED PLANNING PROCESS

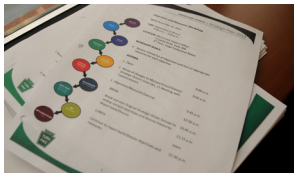
The Pennsylvania Turnpike Commission Executive Management team reviewed the 2014 Strategic Plan prior to, and during, a Leadership Retreat in the summer of 2015. Through thoughtful, collaborative, and unhampered discussions, the Team concluded that the Strategic Plan warranted an amendment to reduce the number of objectives and measures. The intent was to find a more concise blueprint for determining organizational success. Moreover, the Strategic Drivers required modification to appropriately underpin the PTC's overall foundation.

Ensuing meetings with Executive and Management personnel resulted in amended language for the objectives and measures, and also established goals for the amended drivers of Mobility (previously labeled Toll Collection Technology) and Partnership (previously labeled Legislative/Regulatory.)

The expertise, advice, and direction provided by the Executive Management Team (EMT), the PTC Departments, and the PA Turnpike Commissioners was vital to the successful development and completion of this amended plan.

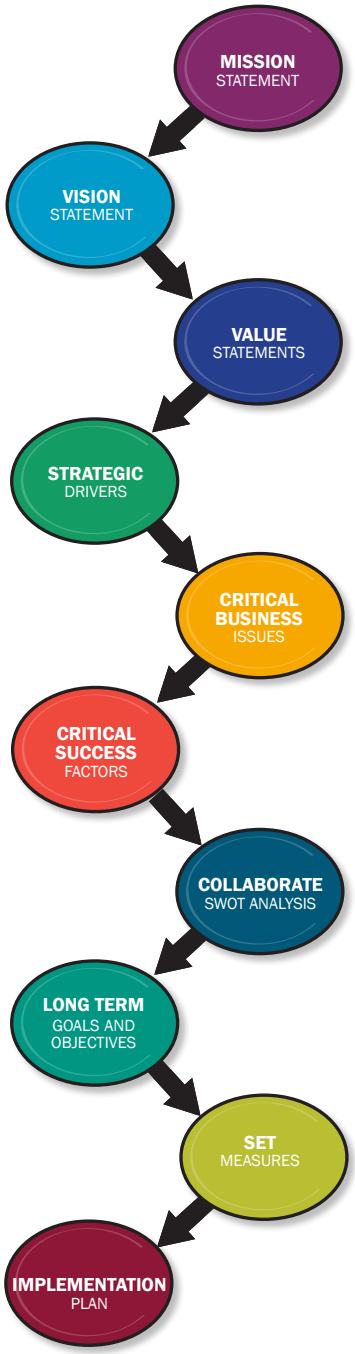
Accepting that the forces which define organizational success are dynamic in nature, the Strategic Plan will be periodically reviewed, amended, and adjusted, as necessary, and scrutinized at least 6 months prior to the end of its 5 year duration.

2015 Leadership Retreat




OUR ORIGINAL PLANNING PROCESS

Strategic Planning Process Chart



Over the 6-month period of the original plan's development, a clear path with well-defined steps was taken to ensure a thoughtful, collaborative process with employee feedback as the foundation. The expertise, advice, and direction provided by the Executive Management Team (EMT), Departments, and Commissioners was vital to the successful development and completion of the 2014 plan. The PTC Strategic Planning Process Chart to the left illustrates the process that was followed for the development of the Strategic Plan, starting with Mission and ending with the final Implementation Plan step. A total of four workshops were held with the EMT to work through the steps. The Commissioners also participated in the development of this plan and were engaged through meetings and updates at their Commission meetings.

Month 1

- Foundation Workshop
- Establishment of the Mission, Vision and Values
- Identification of the Strategic Drivers, Critical Business Issues and Critical Success Factors

Month 2 and 3

- Collaboration with a cross-section of employees from all Departments for feedback on work completed in Month 1
- Strengths, Weaknesses, Opportunities, and Threats (SWOT) Assessment was conducted with all Departments

Month 4

- Establishment of Long-Term Goals and Objectives

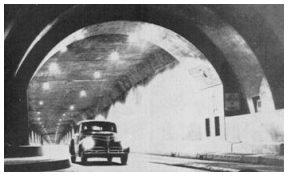
Month 5

- Refinement of Long-Term Goals and Objectives
- Development of Measures

Month 6

- Development and preparation of Strategic Plan



OUR ORGANIZATION AND HISTORY

When the Pennsylvania Turnpike opened on Oct. 1, 1940, motorists lined up for the chance to travel the 160-mile two-lane highway. The general public, engineers, and transportation experts around the nation marveled at the sheer scope of the project and the seven two-lane tunnels through Pennsylvania's mountains that were the principle features of what was dubbed America's First Superhighway.

More than 1,100 engineers worked on the original stretch. When construction began, 155 construction companies and 15,000 workers from 18 states were under contract with the Turnpike Commission. During its first year of operation, daily travel peaked at 10,000 vehicles and a total of 2.7 million vehicles traveled the PA Turnpike.

The Pennsylvania Turnpike Commission celebrated its 75th Anniversary in 2015, and it's fair to say that the designers of the original system would likely not recognize today's Turnpike. Our system has grown to 552 miles, and an average of nearly 545,000 motorists travel the Turnpike each day. In 2015, approximately 195 million motorists traveled on the Turnpike. The system now includes several new Turnpike expansion projects made possible by the passage of Act 61 in 1985. The Mon/Fayette and Southern Beltway Expressway projects, the six-lane widening near Philadelphia, and the second Lehigh Tunnel are just some of the major projects made possible as a result of Act 61. In the past 20 years alone, the Commission has delivered nearly 170 miles of new highway on behalf of its customers and the Commonwealth, creating new capacity, tens of thousands of jobs, and helping to bolster economic development opportunities.

The Commission continues to add capacity to meet growing demands while making smart investments in the Capital Plan. Investments to improve safety for our customers, employees, and business partners, as well as efforts to leverage technology advances in toll collection and Intelligent Transportation Systems, have dramatically transformed our Commission.

Our role has changed, as well, and since the passage of Act 44 in 2007, the Commission is providing funding to PennDOT to help with road, bridge, and mass transit projects across the Commonwealth. In the first six years of Act 44, the Commission transferred nearly $4.1 billion to PennDOT. The payment requirements were modified as a result of Act 89, passed in 2013, and the Commission will continue to assist PennDOT with funding through 2057. The Commission is working more closely with PennDOT than ever before to achieve efficiencies for Turnpike customers and all taxpayers.

This Strategic Plan reflects our organizational commitment to build on the Commission's legacy as an innovative leader in transportation. The Mission, Vision, and Values outlined in this Plan will build a foundation to help reaffirm the Pennsylvania Turnpike Commission as the world's finest superhighway.



OUR PHILOSOPHY

PENNA TURN PIKE

Mission

To operate a safe, reliable, customer-valued toll road system that supports national mobility and commerce.

Vision

In serving our customers, we will reaffirm ourselves as the world's finest superhighway by:

- Fulfilling our public responsibility to provide a safe, sustainable, uninterrupted travel experience
- Becoming an industry leader, a valued business partner and a trusted employer

Values

Communication
We strive to foster continuous communication with our employees, customers, legislators, stakeholders, and business partners.

Customer Service
We maintain the highest level of quality service with a focus on safety, dependability, and mobility.

Diversity
We provide equal opportunity for all employees and business partners.

Innovation
We foster a visionary atmosphere to maintain our role as an industry leader.

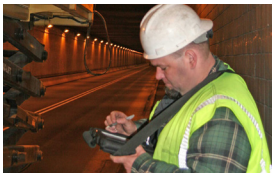
Integrity
We conduct ourselves transparently, responsibly, ethically, and honestly to earn the public's trust every day.

Professionalism
We create a work environment where employees are empowered to take ownership of their work and provide excellence in public service.

Safety
We care deeply about the safety of our employees, customers, and business partners.

Stewardship
We respect current and future generations by using cost-effective strategies that meet today's challenges while safeguarding our resources, our finances, and our environment for tomorrow.

Teamwork
We promote respect and collaboration among all team members to ensure effective and efficient quality service for our customers.




STRATEGIC DRIVERS

Strategic Drivers are those forces that shape an organization's strategy in such a way that they determine the success or failure of the Strategic Plan. These seven Strategic Drivers serve as the basis for the Goals and Objectives, which are the foundation to the Department Business Plans.

Strategic Driver: Safety

Goal: To provide the safest possible environment for our customers, employees, and business partners.

Strategic Driver: Customer

Goal: Meet and exceed customer expectations while providing safe, convenient, reliable travel.

Strategic Driver: Financial

Goal: Maintain a sound financial position.

Strategic Driver: Infrastructure

Goal: Manage our new investments and preserve the life of existing assets (i.e., pavement, structures, facilities, and technology).

Strategic Driver: Mobility

Goal: Achieve an accessible, reliable, and uninterrupted travel highway system.

Strategic Driver: Partnership

Goal: Enhance our stakeholder and business relationships to ensure we are a valued partner.

Strategic Driver: Workforce

Goal: To create a workplace environment that ensures all employees understand, respect, and encourage a commitment to the Commission's values.




STRATEGIC DRIVER: SAFETY

PENNA TURN PIKE

Goal: **To provide the safest possible environment for our customers, employees, and business partners.**

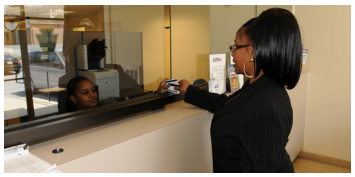
Our people recognize that our obligation is to ensure the safe travel of the approximately 545,000 motorists who rely on our system each and every day; and to make our colleagues and countless business partners, including first responders, safe while working anywhere and at anytime on our system.

Objectives and Measures:

1. **Reduce the number and severity of crashes.**
   Measures: Number of fatal crashes/100 Million Vehicle Miles Traveled (MVMT) (3 yr. avg.); Reportable crashes/Million Vehicle Miles Traveled (3 yr. avg.)
2. **Reduce the number and severity of crashes in work zones.**
   Measure: Work zone related crashes/construction dollars spent (3 yr. avg.)
3. **Reduce the number and severity of "on-the-job" injuries to employees.**
   Measures: Lost time/employee hour for PA Turnpike employees; Number of employees that lost time to injuries; Number of employee equipment accidents; Workers' Compensation payments

DID YOU KNOW?

- In 1996, PTC engineers developed the Sonic Nap Alert Pattern (SNAP) - better known as the shoulder rumble strip.
- The PTC partners with over 150 local fire and ambulance companies across the system to respond immediately to emergencies and incidents.
- The PA Turnpike's investment in safety includes a dedicated team of 820 maintenance workers.
- The State Farm Safety Patrol, staffed by PA Turnpike personnel, is available around the clock by simply dialing *11.
- The PTC operates a 24-hour traffic operations center with state-of-the-art communications technology, including our Highway Advisory Radio System, Roadway Weather Information System, and closed-circuit televisions.



STRATEGIC DRIVER: CUSTOMER

PENNA TURN PIKE

Goal: Meet and exceed customer expectations while providing safe, convenient, reliable travel.

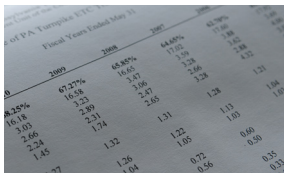
Our people recognize that customers expect a high level of service for their toll dollars and we deliver that high level in every facet of our operations. Customers value our 24/7 maintenance presence on the road, our commitment to ensure a free flow of traffic no matter the weather, and quick and timely response to their inquiries. We understand that 'customers' is not limited to the approximately 545,000 motorists who use our system daily. Our business partners and stakeholders, including local businesses and economic development entities across our system, from engineering and maintenance to legal and financial, value our professional level of service and our deep expertise in all critical areas of our operations.

Objective and Measures:

1. **Improve our customers' experience.**
   Measures: Customer service index from annual customer satisfaction survey; Number of CAC and CSC/VPC inquiries received and the ticket timeframe for closure; Results from the annual customer satisfaction survey on perceived value of toll dollars

DID YOU KNOW?

- The Commission provides a variety of tools for customers to ensure safe and convenient travel, including our 24-hour toll-free TRIP hotline; our Live Travel Conditions Map available on the web and at service plazas; and our Highway Advisory Radio station at 1640 AM.
- The Commission partnered with the private sector to develop the award-winning TRIP Talk App, which broadcasts real-time traffic, roadway conditions, and emergency alerts on any smart phone. Over 700,000 customers downloaded the app in FY16. The app is now available in more than a dozen states.
- The Commission provides our business partners and stakeholders and all Pennsylvanians access to all Commission meeting minutes, agendas, procurement opportunities, and awards on our award-winning website.



STRATEGIC DRIVER: FINANCIAL

PENNA TURN PIKE

Goal: Maintain a sound financial position.

Our staff of financial professionals is deeply committed to managing our customers' toll dollars and the Commission's overall financial position so that we continue to provide a safe and valued travel experience every day while making wise and needed investments in our system's infrastructure. We recognize that the national and global economies, as well as local and state level policy decisions, can have a direct impact on our financial position and we have a responsibility to either help guide or respond accordingly to these external forces.

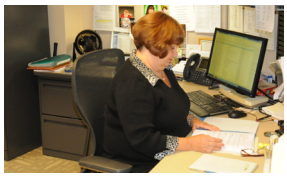
Objectives and Measures:

1. **Maintain and provide support to our credit rating.**
   Measures: Bond rating; Debt services coverage ratio
2. **Improve operational efficiencies.**
   Measures: Percentage of growth in the operating budget; Overall variance between approved operating budget and the year-end budget spending
3. **Maintain or increase toll revenue amount.**
   Measures: Toll revenue amount; Capture rate = Net Toll Captured (Net Toll Revenue + Fee Revenue - Bad Debt and Revenue Adjustments) and Percent of Net Tolls Captured (Net Tolls + Fees - Bad Debt and Revenue Adjustments/Net Tolls + Fee Revenue); Non-toll revenue amount
4. **Promote and analyze the Turnpike's ability to implement innovations.**
   Measure: Number of innovations and innovative practices evaluated by the Innovation Council, AIM, or other PA Turnpike committee

DID YOU KNOW?

- The Commission continued to maintain an investment grade credit rating throughout the national financial crises and recession.
- In 2007, the Commission became a full funding partner with PennDOT as a result of significant changes to state law. Through 2022, the Commission will have provided a total of $7.9 billion in direct funds to the Commonwealth and from 2022-2057, we will provide an additional $50 million per year for Commonwealth transportation projects.
- The Commission's Mapping the Future initiative saved our customers and all taxpayers more than $7 million in the first year and continues to generate savings.



STRATEGIC DRIVER: INFRASTRUCTURE

Goal: Manage our new investments and preserve the life of existing assets (i.e., pavement, structures, facilities, and technology.)

The Turnpike is a 552-mile system that is an integral component of our state and national ground transportation network that must be protected and constantly improved for our generation and generations to come. Our customers expect a safe travel experience and in order to ensure their satisfaction, we must make smart investments in all of our systems. Our responsibility to be good stewards of this system extends beyond the lane miles and includes responsible maintenance of all of our facilities and the technology that we use to manage all of our assets.

Objectives and Measures:

1. **Maintain and improve assets in a "good" state of repair while using a life cycle approach.**
   Measures: Percentage of structurally deficient bridges by number and deck area; Overall average Pavement Condition Rating (PCR) of 80 or better and a minimum PCR of 65 for any roadway section; Overall average IRI between 71 and 100 with a maximum of 150 for any section; Number of elements from the latest tunnel inspection with a condition rating of 3 (poor) or 4 (severe); Implementation of Asset Management Systems; Implementation of Facility Condition Index (FCI) and continued improvement of assessment scores; Percentage of System Availability
2. **Manage the delivery of the Capital Plan.**
   Measure: Overall variance between the approved Capital Plan and the year-end Capital Plan spending
3. **Manage resource consumption.**
   Measure: Annual energy consumption
4. **Aid in preserving the quality of pavement and structures by developing and delivering an Annual Work Plan.**
   Measure: Percent complete of Annual Work Plan

DID YOU KNOW?

- The PTC's Total Reconstruction Program was launched in 1999, and in 2012 we completed the 100th mile of total reconstruction.
- The PTC is the first toll-road organization to purchase and rely on wind-generated power and the Central Administration Building is the first "Certified Green" state office building in PA.

STRATEGIC DRIVER: MOBILITY

PENNA TURN PIKE

Goal: Achieve an accessible, reliable, and uninterrupted highway system.

Our people recognize that as toll collection technology continues to evolve, our customers increasingly demand safer, more efficient, and more convenient travel on our system. Since the introduction of E-ZPass in 2000, our customers continue to enroll in increasing numbers and we have worked to manage this transformation for customers and our workforce. We have also maintained a high level of attention to our customers who continue to pay their tolls in cash. While the Commission continues to accept cash payments for tolls, our customers will not see any reduction in the level of service they currently enjoy. The Commission's hybrid cash and E-ZPass system poses long-term challenges for customers and the organization that can only be addressed through the implementation of cutting edge technology that is transforming our industry.

Objectives and Measures:

1. **Achieve an efficient toll collection system through the increased use of E-ZPass and expanded use of toll collection alternatives.**
   Measures: On-schedule implementation of cashless tolling pilot program at the Delaware River Bridge and Beaver Valley Expressway; Percentage of transactions that are E-ZPass; Percentage of revenue that is E-ZPass; Percentage of transactions that are Toll by Plate; Percentage of revenue that is Toll by Plate; Capture rate of Toll by Plate
2. **Increase mobility and reliability in travel time.**
   Measures: Travel Time Index; Planning Time Index; Clearance time by incident type; Wasted time per customer by vehicle type; Percent of congested travel
3. **Implementation and incorporation of a Reconstruction Long Life Strategy.**
   Measure: Complete plans and implement systems

DID YOU KNOW?

- E-ZPass usage exceeded the 70% threshold in 2013 across our entire system and more than 50% in every region.
- The E-ZPass system is compatible with 38 toll agencies in the Midwest and the Northeast so customers can travel without stopping to pay a toll in 16 states. The tolling industry is working toward national interoperability so that E-ZPass transponders will work on any tolled facility and our system will accept any system's transponder.
- Approximately 35 tolling agencies in the nation have already converted or are planning a transition to an All-Electronic Tolling (AET) system, which is safer for motorists, better for the environment, and more efficient for agencies.




STRATEGIC DRIVER: PARTNERSHIP

Goal: Enhance our stakeholder and business relationships to ensure we are a valued partner.

Established by law in 1937, our governmental stakeholders include public officials, agencies, regulators, and policymakers at the local, state, and national levels of government. We also work closely with municipal, county, and regional officials throughout the state ensuring coordination of design and construction projects as well as timely communication of Commission activities to our customers and business partners. Since Act 44 in 2007, our role as a statewide transportation entity has evolved significantly, and our team continues to adapt and work closely with our stakeholders and customers. Act 89 of 2013, a landmark transportation funding law, has positioned the Commission well to pursue a strong, yet independent, working relationship with PennDOT to partner on initiatives that will provide operational efficiency, modernization, and innovation to both agencies.

We further understand the challenges and opportunities that our Total Reconstruction initiative poses to local elected officials and local leaders across our system. We recognize the need to forge positive, collaborative partnerships with our governmental stakeholders as an important requirement in achieving our vision to reaffirm ourselves as a worldwide leader in the provision of transportation services.

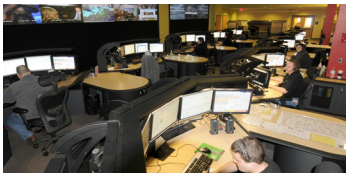
Objectives and Measures:

1. **Advocate for favorable legislative and regulatory initiatives.**
   Measure: Quarterly review and evaluation of key legislative initiatives

2. **Forge positive and collaborative relationships through outreach and education programs and timely responses to inquiries.**
   Measures: Number of outreach and education programs initiated and participated in with our partners; Response time to inquiries and reporting outcomes by partner type

DID YOU KNOW?

- The Turnpike was initially proposed in 1934 and planners were focused on transforming the old Vanderbilt roadbed and tunnels into a toll-highway. In April 1935, Representative Cliff S. Patterson introduced House Resolution No. 138 to authorize a feasibility study and the Turnpike opened to motorists on Oct. 1, 1940.
- In 1985, the legislature passed a law (Act 61) directing the Turnpike to design, build, construct, and maintain numerous new expansion projects across the state. Most of these projects have been constructed and open to the public.
- Since our opening, we have successfully operated and maintained the bulk of the Turnpike system without the use of tax dollars – relying solely on toll dollars and bonding (limited tax dollars have been invested in the expansion projects).

STRATEGIC DRIVER: WORKFORCE

Goal: To create a workplace environment that ensures all employees understand, respect, and encourage a commitment to the Commission's values.

The success of this Strategic Plan and the long-term viability of the Pennsylvania Turnpike Commission will be determined by our dedicated team of professionals who remain committed to meeting our customers' needs at all times, in every decision that is made, and action that is taken.

Objectives and Measures:

1. **Improve our compliance and transparency efforts.**
   Measures: Percentage of accepted audit recommendations implemented; Percentage of accepted Advisory Committee recommendations implemented

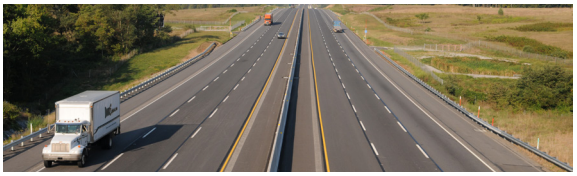
2. **Meet or exceed the specified Diverse Business commitment for individual contracts: construction, engineering professional services, and job order.**
   Measures: Construction Contracts: On a contract by contract basis, the total amount paid to Diverse Businesses versus the total amount paid on the respective prime contract, compared to the final Diverse Business commitment for the respective prime contract; Engineering Professional Services: On a contract by contract basis, the total amount paid to Diverse Businesses versus the total amount paid on the respective prime contract, compare to the 10% MPL goal; Job Order Contracts: On a contract by contract basis, the amount paid to Diverse Businesses versus the total amount paid on the respective prime contract, compared to the 10% MPL goal

3. **Employ a workforce whose demographics reflect the demographics of the Counties/Regions the Turnpike traverses, transportation industry standards, and Commonwealth agencies.**
   Measure: Comparison of the Turnpike employment demographics versus the demographics listed in the objective

4. **A strategically planned, engaged, and prepared workforce.**
   Measures: Enhance training and development curriculum Commission-wide (number of department trainings reviewed, updated, eliminated, and added); Voluntary and involuntary turnover rate and cost (Commission-wide and by Department)

DID YOU KNOW?

- The Commission is committed to the development of our employees; in return, the employees have shown their commitment to the PA Turnpike by providing on average more than 14 years of dedicated services.
- Since its creation in the spring of 2013, the All Ideas Matter (AIM) Program has received over 255 ideas. Many of these ideas have been implemented for operational and personnel relations improvements and have opened a new line of communication at the Turnpike.



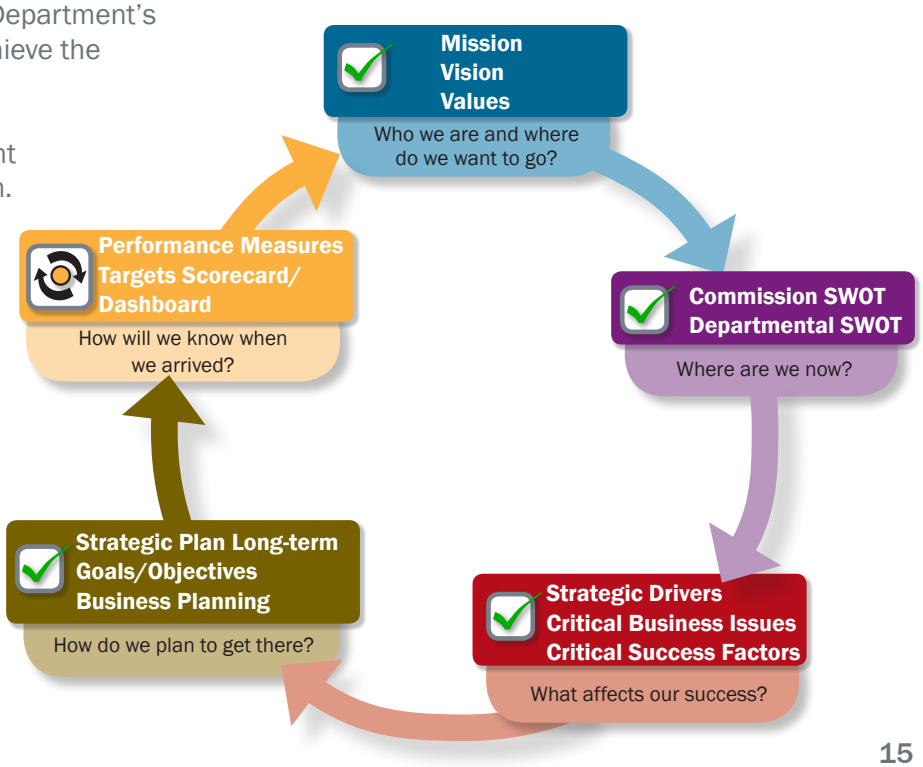
OUR APPROACH MOVING FORWARD

Our Executive Management Team (EMT) is excited to work together to help re-establish the Commission as a world leader in our industry. The process begins with increased communication within our Commission from one Department to the next. Doing more as an organization to empower our talented colleagues to become more active in the decision-making process will ensure great strides in our drive toward success. We have a tremendous pool of professionals committed to working together to address the opportunities and challenges.

The Strategic Plan established overall Commission goals and objectives to achieve over the next five years. These objectives were assigned to an owner and co-owner from the EMT. It is now up to the owner, co-owners, and their respective Department staff to develop specific steps, also known as tactical initiatives, to achieve those goals and objectives. The goals and objectives form the basis for Department-specific Business Plans. The Business Plans convey how each respective Department will contribute to achieving the Commission's goals and objectives and serve as a road map to chart the direction over the next year. The Business Plans are tied to the PTC's annual budget and will serve as our "scorecard" throughout the year. The Business Plans will be re-visited yearly to update and revise as necessary. The fiscal year-end results from the Business Plans will also be a tool that will be used as a part of employee evaluations.

The "dashboard," containing all of the goals and objectives to be achieved by each Department in each quarter, will provide information on progress towards the established target for the objectives. Progress will also be measured on each Department's tactical initiatives needed to achieve the objective and target.

This Strategic Plan is a significant step forward for our organization. It is a tool that provides a foundation for how we conduct ourselves every day and serves as a blueprint as we move forward to address the rapidly changing transportation landscape we face.



THANK YOU

Thank you to those who contributed to the development of this Strategic Plan.

A great deal was accomplished during this Strategic Planning process. This document is a guide for staff to ensure we are staying on course and moving forward toward our mission.

Pennsylvania Turnpike Commission
P.O. Box 67676
Harrisburg, PA 17106-7676

www.paturnpike.com

2014
(Amended May 2016)

FOR MORE INFORMATION

Pennsylvania Turnpike Commission
P.O. Box 67676
Harrisburg, PA 17106-7676

www.paturnpike.com

November 2016