



Statewide Interstate Tolling Strategic Plan

Indiana Department of Transportation



November 2018

TABLE OF CONTENTS

- 1. INTRODUCTION 1
- 2. OPEN ROAD TOLLING - THE DRIVING EXPERIENCE 4
- 3. TOLL RATE STRATEGIES 9
- 4. OPERATIONAL STRATEGIES13
- 5. FINANCIAL STRATEGIES23
- 6. ENVIRONMENTAL REVIEW STRATEGIES26
- 7. IMPLEMENTATION STRATEGIES28
- 8. CONCLUSION.....34
- NOTES36
- APPENDIX A: CONCEPT OF OPERATIONS.....A1
- APPENDIX B: ENGINEERING & ENVIRONMENTAL ANALYSISB1
- APPENDIX C: TRAFFIC & REVENUE ANALYSIS.....C1
- APPENDIX D: FINANCIAL ANALYSIS.....D1
- APPENDIX E: TABLE OF ACRONYMS.....E1

TABLE OF FIGURES

Figure 1-1. State Highway Revenue Projections	2
Figure 2-1. Tolling Today	4
Figure 2-2. Michigan Road Toll House in Indianapolis.....	5
Figure 2-3. Open Road Tolling in the U.S.....	6
Figure 3-1. Example of a 2-Axle Truck.....	10
Figure 3-2. Example Tolls at \$0.07 and \$0.38 per Mile with a Transponder	11
Figure 4-1. Example of Monotube Toll Gantries (Illinois Tollway)	14
Figure 4-2. Example of Pavement Loops at Tolling Location.....	15
Figure 4-3. Examples of Images Captured by Toll Cameras	16
Figure 4-4. Toll Interoperability Regions.....	17
Figure 4-5. Example Windshield Sticker Transponder used for ORB in Southern Indiana.....	18
Figure 4-6. Back-Office and Customer Service Center Operations.....	19
Figure 4-7. Fiber Optic Cable	21
Figure 4-8. INDOT Hoosier Helpers Vehicle.....	21
Figure 8-1. Potential Toll Revenue Compared to Revenue from Existing Sources	34

TABLE OF TABLES

Table 3-1. Example Toll Rates Per Mile for Vehicles Paying by Transponder	9
Table 3-2. Example Toll Rates per Mile for Vehicles Paying by Transponder.....	11



1. INTRODUCTION

Indiana has not made the decision to implement a statewide interstate tolling program. Based on Indiana House Enrolled Act (HEA) 1002, the Indiana Department of Transportation (INDOT) was directed to investigate tolling as a possible way to fund major interstate improvements, such as widening I-65 and I-70 outside of I-465 to at least six lanes, border-to-border. INDOT estimates this work would cost around \$4.65 billion¹, which is more than four times INDOT's entire 2018 capital program. Interstate tolling could fund this work, along with other improvements needed to improve mobility for

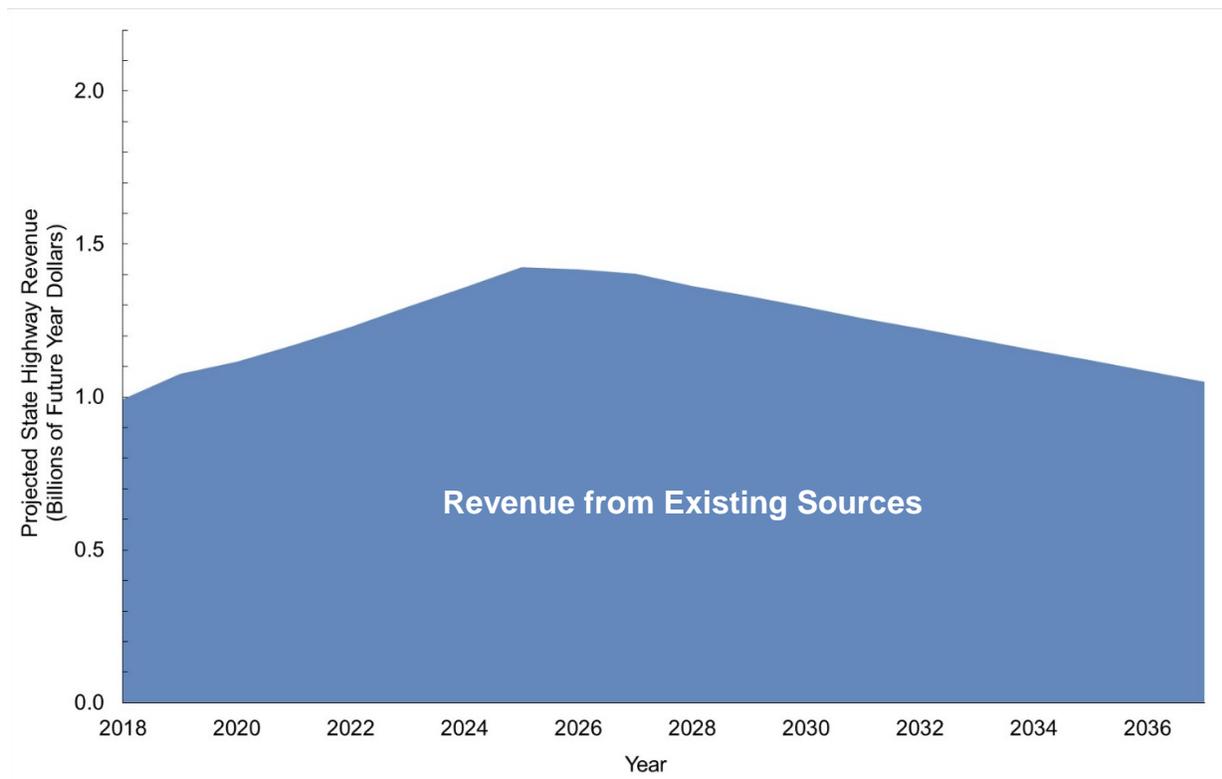
Indiana's residents.

Tolling could also be part of a long-term, financially sustainable transportation program for the state of Indiana. Today, most of Indiana's highway funding is derived from gas taxes. However, as auto makers continue to improve fuel efficiency, fuel consumption and gas tax revenues will decrease. Gas consumption in the U.S. is projected to decline by more than 30 percent over the next 30 years.² Based on this trend, a growing consumer desire for higher fuel efficiencies, and the eroding purchasing power caused by inflation, INDOT expects state highway revenue to begin declining in the mid-2020s. This trend is illustrated in Figure 1-1. HEA-1002 required INDOT to consider whether tolling might put Indiana in a position to create a long-term financially sustainable transportation program.

¹ This cost estimate reflects 2018 dollars and has not been adjusted to account for inflation. Information on how this cost estimate was developed is provided in *Appendix B: Engineering & Environmental Analysis*.

² U.S. Energy Information Administration, *Annual Energy Outlook 2018*, February 6, 2018.

Figure 1-1. State Highway Revenue Projections³



Given the funding potential of interstate tolling, INDOT has taken a critical look at how it **could** implement a statewide interstate tolling program **if** Indiana decides to proceed.

This document presents potential strategies for tolling I-65, I-70, and I-94. In its 2017 *Tolling Feasibility Study*, INDOT assessed the potential to toll a broader set of interstates.⁴ INDOT focused the interstate tolling strategic planning process on I-65, I-70, and I-94 because they have the highest traffic volumes, highest maintenance costs, and greatest future need for major interstate improvements. Additional interstates could be considered in subsequent phases.

Implementing a statewide interstate tolling program would be complicated. It would involve a wide range of technical, social, environmental, financial, and regulatory challenges. A growing number of states are showing interest in interstate tolling, but none have implemented a comprehensive statewide program for all vehicles. Indiana

³ This graph does not include Next Level Connections funds because they have already been targeted to specific projects and non-roadway programs.

⁴ *Tolling Feasibility Study*, prepared for the Indiana Department of Transportation by HDR, Inc., October 31, 2017.

is leading the way in defining how an interstate tolling program could be realized. Implementation would also take time. If Indiana decides to implement a statewide interstate tolling program, it would take at least four years to collect the first toll and decades to complete a comprehensive statewide program.

As directed by Indiana HEA-1002, INDOT has evaluated how it could address these challenges. This Strategic Plan presents the results of this effort. It starts by describing how drivers would experience a state-of-the-art open road tolling system. It then presents a series of strategies for how Indiana could implement this type of system.

The strategies are based on INDOT's detailed analyses of:

- An evaluation of tolling operations options and best practices. The results of this analysis are presented in *Appendix A: Concept of Operations*.
- An assessment of the engineering and environmental feasibility of widening I-65 and I-70 outside of I-465 to at least six lanes, border-to-border. The results of this analysis are presented in *Appendix B: Engineering & Environmental Analysis*. This document also includes a cost estimate for the potential widening work.
- An analysis of potential traffic and revenue for various toll rate scenarios and implementation sequencing options. The results of this analysis are presented in *Appendix C: Traffic & Revenue Analysis*.
- A financial analysis to explore if a potential statewide interstate tolling program could fully support itself without any state taxes and without impacting the state's bond rating. The results of this analysis are presented in *Appendix D: Financial Analysis*.

These strategies also draw from decades of tolling experience in Indiana and across the country and reflect the latest trends in tolling technology and operations. Tolling in the U.S. continues to evolve and improve. INDOT will revisit these strategies as needed to take advantage of future advances.

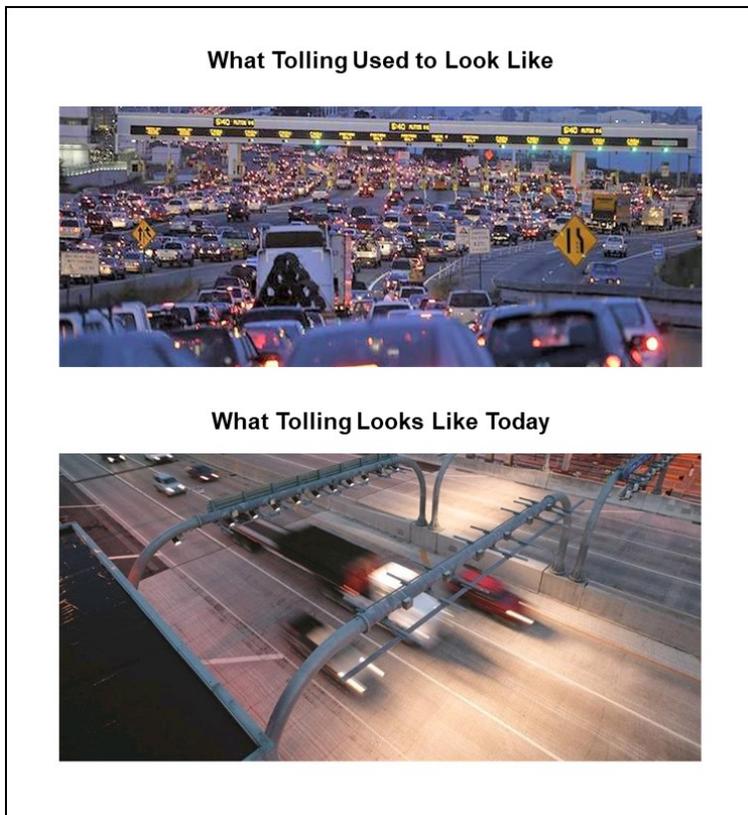
This Strategic Plan provides a practical, data-driven, and financially sound approach for how INDOT could implement a statewide interstate tolling program. Its development was an important step in a larger conversation as Indiana considers major interstate improvements and options for maintaining a long-term, financially sustainable transportation program.



2. OPEN ROAD TOLLING - THE DRIVING EXPERIENCE

Historically, toll roads required drivers to stop at toll booths and pay the tolls in cash. This is no longer the case. Open road tolling enables drivers to pay electronically, without stopping or even slowing down. Figure 2-1 illustrates what tolling used to look like, and what it looks like today.

Figure 2-1. Tolling Today



For this Strategic Plan, INDOT has assumed that a statewide interstate tolling program would use open road tolling exclusively. There would be no toll booths.

2.1 A Brief History of Tolling in the U.S.

Throughout the 18th century, most roads were built with local funds. In many cases, male citizens paid a “road tax” by helping construct and maintain roads a certain number of days each year. In 1792, a private company in Pennsylvania built the first long-distance paved road in the U.S. and tolled it. This project started the nation’s first wave of tolling. In the 19th century, portions of Michigan Road, Indiana’s first major state road, were tolled to help fund its upkeep.

In the early 20th century, the federal government directed states to increase control over local road-building and improve the nation’s roadways. Tolling was used to fund many roads during the subsequent building boom. Examples include New York City’s Holland Tunnel in 1927 and the Golden Gate Bridge in 1937. In this same period, Oregon passed the nation’s first gas tax in 1919 to help fund road construction. Over the

next decade, every other state followed their lead. The U.S. passed the first national gas tax in 1932 as part of a broad financial plan during the Great Depression.

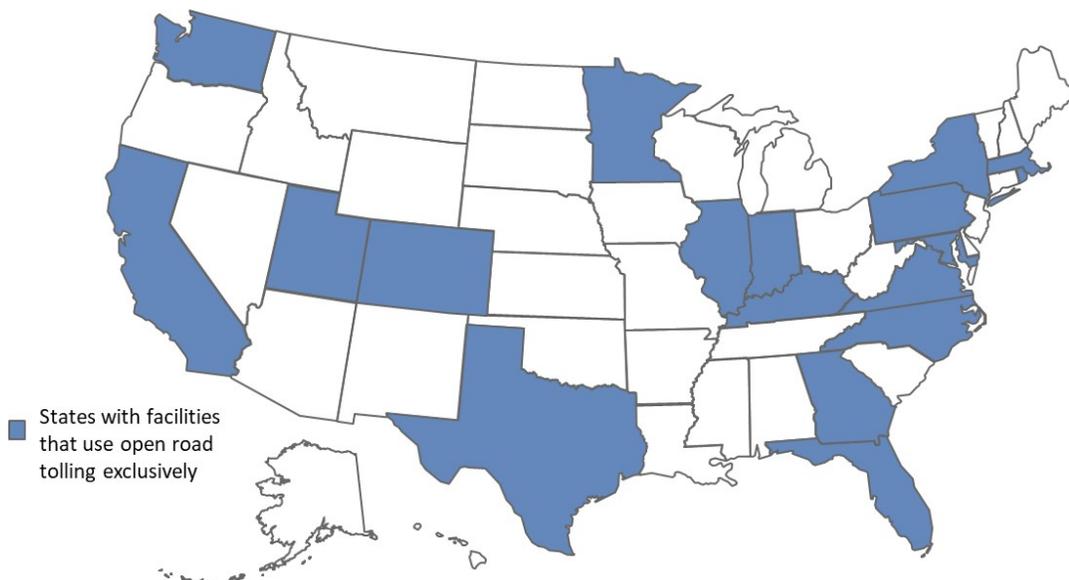
After World War II, states began to understand the importance of facilitating travel between states. Again, tolling helped to fund a subsequent building boom. The 1956 Federal-Aid Highway Act authorized \$25 billion for the construction of the Interstate Highway System. Many toll roads that had been built prior to this legislation were incorporated into the interstate system. Examples include the Ohio Turnpike, which opened in 1954; the Indiana Toll Road, which opened in 1956; and the first section of the Illinois Tollway, which opened in 1958. These types of facilities are what many people think of when they hear the words “toll road.” Open road tolling is changing this perception. Some agencies use open road tolling in combination with toll booths. The first facility in the U.S. to use open road tolling exclusively opened in Texas in 2006. Since then, this approach has been used widely in the U.S., including on the Ohio River Bridges in southern Indiana, as illustrated in Figure 2-3.

The evolution of tolling technology is one of the main drivers of the recently renewed interest in interstate tolling. Other drivers include the age of the interstate system, improvements in vehicle fuel economy that drive down gas tax revenue, and the recognition of tolling as a user fee instead of a tax. Like the fees charged for using state parks, parking on public streets, and renting laptops in public schools, tolls link the cost of a service to the users of that service.

Figure 2-2. Michigan Road Toll House in Indianapolis



Figure 2-3. Open Road Tolling in the U.S.



The following text describes open road tolling from a driver’s perspective. Chapter 4 provides more details on the equipment that makes this type of tolling possible.

2.2 What would a statewide interstate tolling program look like in Indiana?

When Hoosiers update their vehicle registration each year, they receive a license plate sticker in the mail. If Indiana decided to implement a statewide interstate tolling program, this mailing would include a free window sticker and instructions for registering for a tolling account. Although small, the sticker would house a toll transponder.

After setting up a toll account online and affixing the sticker to their windshield, drivers would be ready to use the toll roads. They would not be required to use them though; they would always be able to take non-tolled routes, if preferred.

Once on a tolled interstate, drivers would occasionally pass under a set of toll gantries. A series of pavements loops, cameras, and electronic sensors would detect the car and assign the appropriate toll. The equipment would capture information on the vehicle, but it would be unable to see the driver or passengers. All of this would occur instantly as the vehicle moves full speed. Drivers would not be required to stop or even slow down. If it were not for the tolling equipment and the signs leading up to it, drivers may not even know that they were passing through a toll zone.

They would, however, know that they were on a tolled interstate. For one, they would notice the road looks and feels nicer than other roads. This is because the tolled interstates would have higher maintenance standards than non-tolled roads. They would also notice their travel time is more reliable. Automated signs would inform drivers of current travel times, and breakdowns and traffic incidents would be cleared-up faster, decreasing unexpected delays.

If tolling was paired with the border-to-border widening of I-65 and I-70 outside of I-465, drivers would notice even more improvements. Traffic would flow smoother on the widened roadways. It would be easier to pass large trucks and slower moving vehicles. Delays caused by construction would go down because of the extra travel lanes and wider shoulders. And most importantly, traffic accidents would decrease. INDOT estimates that widening and modernizing a four-lane interstate can decrease accidents by 20 percent.⁵

Drivers may also notice additional benefits of having a registered toll transponder. For example, many parking facilities use the same transponder technology as tolling agencies. Drivers might be able to use their transponders to pay for parking at sporting events or concerts. Truck drivers might be able to use their transponders to reserve overnight parking spaces. The International Parking Institute envisions an even tighter link between parking and toll transponders. For example, they envision benefits at airports such as parking space reservation, free-flow entry and exit, frequent use points and rewards, and access to additional services such as car washes and fuel fill-ups.⁶

Hoosiers would also be able to use their Indiana transponder when they travel on other toll facilities in Indiana and other states. All tolls would be consolidated onto a single monthly invoice.

The information collected by the tolling equipment would be processed automatically, and drivers would receive monthly invoices that summarize their tolling transactions.

Drivers without a transponder would experience the same benefits and ease-of-use. However, they would pay higher tolls to cover the higher cost of toll collections. As they drive through a toll gantry, the tolling equipment would count the number of axles on their vehicle and capture an image of their license plate. Again, all of this would

⁵ *South Central Indiana Expansion Project (I-65) Appendix I; Benefit-Cost Analysis Supplementary Documentation*, prepared by WSP for INDOT, July 2018.

⁶ Wenzel, Joseph, *Recognizing Advances*, International Parking Institute, January 2012.

happen without them stopping or slowing down. The information would be used to identify the owner of the vehicle and mail them an invoice for the tolls.

Drivers who lose their transponders or are unable to obtain one through the vehicle registration process would be able to purchase one at convenient retail locations across the state. Customer service would be available through a website, by phone, and in person at walk-up centers located around the state.

2.3 How would INDOT Implement Open Road Tolling?

The following chapters define a series of strategies that illustrate how INDOT would implement open road tolling if Indiana decides to move forward with a statewide interstate tolling program.



3. TOLL RATE STRATEGIES

This chapter describes how INDOT would establish toll rates for a statewide interstate tolling program. The market driven toll rates would be in line with rates used by comparable toll agencies in the U.S., vary by vehicle type, and balance revenue and traffic diversion.

3.1 Establish market driven toll rates that are equitable with rates used on comparable toll facilities

Table 3-1 provides a summary of average toll rates charged by the Indiana Toll Road in northern Indiana, the Illinois Tollway, and other states. The rates for a 2-axle car paying electronically with a transponder range from \$0.04 to \$0.10 per mile. Toll rates in urban areas are typically higher than those shown in the table. The table also shows that rates for 5-axle trucks are three to six times higher than for 2-axle vehicles. This increase helps account for the additional wear and tear caused by heavier vehicles.

Table 3-1. Example Toll Rates Per Mile for Vehicles Paying by Transponder

Toll Facility	2-Axle Vehicles	5-Axle Vehicles
Ohio Turnpike	\$0.05	\$0.17
Florida Turnpike	\$0.07	\$0.21
Indiana Toll Road	\$0.07	\$0.38
Illinois Toll Roads (average)	\$0.08	\$0.49
Pennsylvania Turnpike	\$0.10	\$0.52

3.2 Establish toll rates that vary by axle count

There are two options for classifying vehicles electronically: 1) count the number of axles; and 2) count the number of axles AND analyze the shape of the vehicle. The second option enables toll agencies to identify 2-axle trucks like the one pictured in Figure 3-1 and charge them a higher rate than 2-axle autos.

Figure 3-1. Example of a 2-Axle Truck



Although the second option would generate more revenue, most toll agencies in the U.S. use the first option because it is more reliable, easier to explain to customers, and cheaper to implement. Therefore, INDOT would establish three toll rates that vary by axle count:

- 2 axles;
- 3 and 4 axles; and
- 5 or more axles.

3.3 Establish rates that balance revenue and traffic diversion

In general, as toll rates increase, toll revenue and traffic diversion increase. Traffic diversion occurs when drivers seek alternate routes to avoid a toll. One of INDOT's goals for an interstate tolling program would be to balance revenue and diversion. If toll rates are too low, revenue would be low and the tolling program could be financially unsustainable. If toll rates are too high, traffic diversion could be high and non-tolled alternate routes could be adversely affected.

For planning purposes, INDOT has evaluated the tolling scenarios presented in Table 3-2. The rates range from the rates presented in INDOT's *Toll Feasibility Study* (Scenario 1) to the rates used by the Indiana Toll Road (Scenario 4).

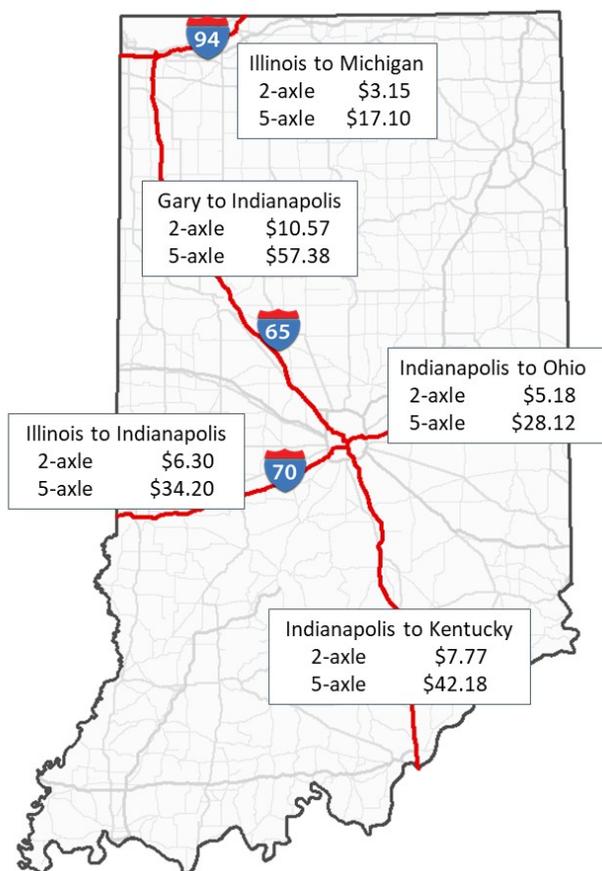
Table 3-2. Example Toll Rates per Mile for Vehicles Paying by Transponder

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
2 axles	\$0.04	\$0.05	\$0.06	\$0.07
3 and 4 axles	\$0.06	\$0.07	\$0.08	\$0.10
5 or more axles	\$0.19	\$0.20	\$0.24	\$0.38
Estimated annual gross revenue in 2045 ¹	\$810 M	\$920 M	\$1.08 B	\$1.42 B
Estimated diversion in 2045	6.0%	6.7%	7.5%	8.9%

¹ Gross revenue is shown in 2018 dollars and does not account for collection costs, which could range from 10 to 20 percent.

Figure 3-2 presents example tolls using the scenario for a toll rate of \$0.07 per mile for a 2-axle vehicle and \$0.38 per mile for a 5-axle vehicle.

Figure 3-2. Example Tolls at \$0.07 and \$0.38 per Mile with a Transponder



3.4 Charge higher rates when vehicles do not have a transponder

Vehicles that do not have a transponder and an account with a positive balance would be billed by mail, based on an image of their license plate. Billing by mail costs more than billing electronically because it requires reading a license plate number from a photo, tracking down contact information for the driver associated with the plates, and mailing an invoice. INDOT would increase the toll rates for vehicles without a transponder to cover these additional costs. For planning purposes, INDOT has assumed a 50 percent increase in toll rates for vehicles without a transponder in good standing. A 50 percent increase is consistent with increases used by tolling agencies throughout the U.S.

3.5 Explore tolling discounts

Some tolling facilities, including the Ohio River Bridges in southern Indiana, provide a frequency-based toll discount aimed at commuters. INDOT would evaluate the costs and benefits of implementing a statewide frequency-based discount. INDOT would also evaluate the feasibility of providing discounts for low-income households.

3.6 Tie toll rates to inflation to ensure long-term financial sustainability

Adjusting toll rates based on inflation rates would enable rates to keep pace with escalating construction, maintenance, and operations costs.

3.7 Apply rates consistently to in-state and out-of-state traffic

Vehicles impact roadways the same regardless of where they are registered. Therefore, INDOT would use the same toll rates for in-state and out-of-state vehicles.

3.8 Explore using toll rates as a congestion management tool

Several agencies in the U.S. use tolling to help mitigate congestion in urban areas. For example, tolls on portions of I-25 in Denver more than double during rush hour. The most congested highways in Indiana are in the Indianapolis region and the northwestern part of the state. INDOT would explore the use of tolls as a congestion management tool in these areas.



4. OPERATIONAL STRATEGIES

This chapter describes how INDOT would operate a statewide interstate tolling system. The tolling system would reflect best practices and trends in tolling operations, enable tolling while vehicles travel full speed down an interstate, and be user-friendly. Additional information on these operations strategies is provided in *Appendix A: Concept of Operations*.

4.1 Implement a tolling system that reflects a state-of-the-art statewide system

There are two tolling systems currently operating in Indiana:

- The Ohio River Bridges in southern Indiana uses an open road tolling system like the one described in this document.
- The Indiana Toll Road in northern Indiana combines electronic tolling with toll booths, which enable drivers to pay with cash or a credit card.

In addition, tolling is being considered for a new Ohio River crossing between Evansville, IN and Henderson, KY.

A statewide interstate tolling system would have some similarities to these systems. However, it would not match them completely. INDOT would take advantage of lessons learned from the Ohio River Bridges, the Indiana Toll Road, and facilities across the U.S., and design an open road tolling system that operates efficiently and effectively on a statewide scale. This statewide view is critical because INDOT projects the number of toll transactions could eventually exceed millions a day.

4.2 Use a standard, low-maintenance toll gantry

INDOT would mount tolling equipment on monotube toll gantries similar to those shown in Figure 4-1.

Figure 4-1. Example of Monotube Toll Gantries (Illinois Tollway)



Monotube gantries would provide the following benefits:

- Simple, uniform structural design with a modern and aesthetically appealing look;
- Flexibility regarding the types of tolling equipment that could be mounted;
- Reduced wind load impacts resulting in improved toll system accuracy;
- Less expensive than more elaborate toll gantries used by other tolling agencies;
- No additional right-of-way required for gantries; and
- Minimized traffic disruption during construction, installation, and maintenance.

4.3 Use multi-protocol Automated Vehicle Identification readers

Automated Vehicle Identification (AVI) readers capture vehicle information by reading transponders. They enable agencies to collect tolls electronically for vehicles with registered transponders. INDOT would install AVI readers at each toll location. The readers on the market today can use different communication protocols simultaneously. These multi-protocol readers make it easier for drivers to use their transponders when they travel out of state. Since there are toll facilities in and around Indiana, INDOT would use multi-protocol AVI readers that are compatible with national tolling standards.

4.4 Use pavement loops to classify vehicles

Axle-based tolling requires counting the number of axles on each vehicle. Once INDOT determines how many axles a vehicle has, it can charge the correct toll rate. INDOT would capture this information using pavement loops, like those used at signalized intersections. Figure 4-2 provides an example of what these loops could look like. The overhead cameras described next would support the classification process.

Figure 4-2. Example of Pavement Loops at Tolling Location



4.5 Capture images of vehicles passing through each toll location

INDOT would install digital high-resolution cameras on the toll gantries to capture digital images of vehicle license plates. These cameras would allow INDOT to identify the owners of vehicles that do not have transponders. INDOT would use cameras that take images of the front and rear portions of vehicles where license plates are attached. This camera angle would enable INDOT to avoid privacy concerns related to capturing the photographs of individuals within a vehicle. Taking pictures of front license plates will assist in retrieving accurate information for those vehicles not registered in Indiana.

Figure 4-3. Examples of Images Captured by Toll Cameras



4.6 Capture continuous video at each toll location

To support toll system auditing and customer issue resolution, INDOT would install digital high-resolution cameras that capture video footage of vehicles. The cameras would be mounted overhead on the gantries and be aimed straight down. They would be unable to capture footage of individuals in a vehicle. INDOT would be able to access the digital video in real time or as needed later.

4.7 Use a secure communications network

INDOT would use a secure fiber-optic based wide area network to connect toll equipment to a central facility. In addition, each toll zone would be able to operate in stand-alone mode for at least 30 days. This set-up would enable INDOT to continue to collect information needed for toll processing in the event of a network shutdown and mitigate the risk of revenue loss due to a communications issues.

4.8 Join an established interoperability service provider

Tolling interoperability consists of the technology, processes and agreements that enable a customer with a transponder and registered toll account at one agency to travel on another agency's toll facility and seamlessly pay a toll. For example, a Hoosier driver with an E-ZPass can use their transponder to pay tolls electronically in Ohio. Figure 4-4 illustrates how toll interoperability in the U.S. has evolved to be predominantly regional. The states shaded in colors have facilities that are interoperable with each other. The states shaded in grey have electronic tolling facilities that do not offer out-of-state interoperability.

Figure 4-5. Example Windshield Sticker Transponder used for ORB in Southern Indiana



4.10 Encourage Hoosiers to open a transponder account

The overall success of open road tolling depends on the number of customers that pay through a pre-paid account associated with a transponder. Revenue collection via transponder is more accurate, cost-effective, and customer friendly than video billing by mail. Therefore, long before tolling begins, INDOT would distribute free transponders via mail along with instructions for account registration. This could be done, for example, at the same time vehicle registration stickers are mailed.

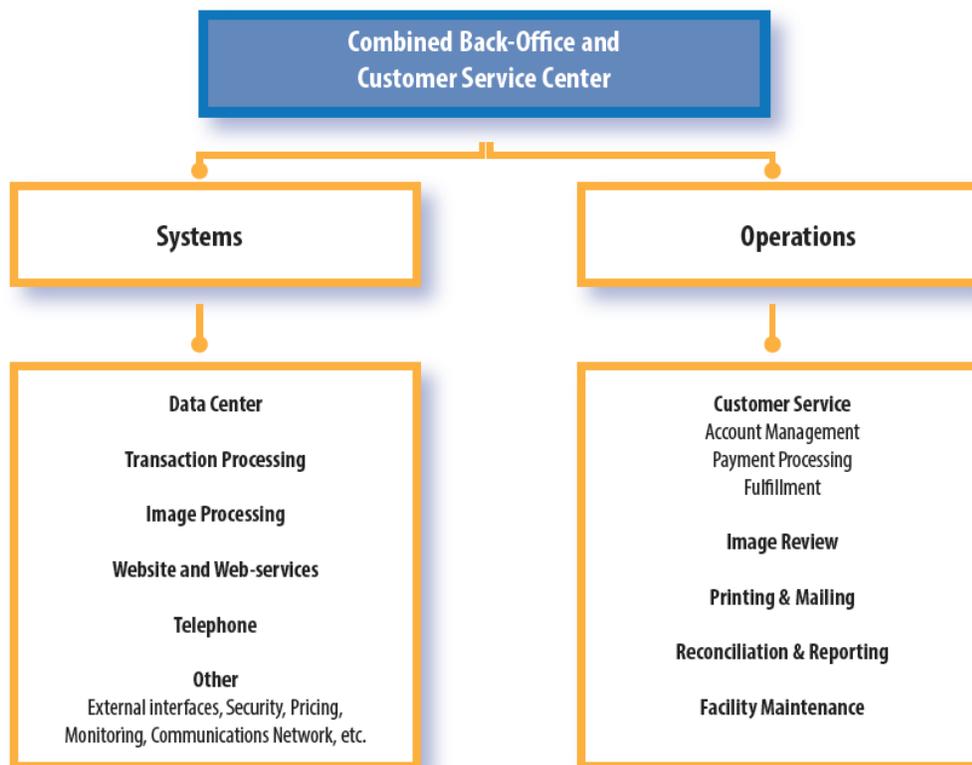
INDOT would also implement a significant marketing campaign to explain the benefits of opening an account. The biggest benefit for drivers would be lower toll rates. INDOT's goal would be to maximize the number of drivers who have a registered transponder account on day one of tolling operations. Longer term, INDOT estimates that about 85 percent of cars and 90 percent of trucks would pay tolls with a transponder.

4.11 Establish a tolling back-office and customer service center in Indiana

Tolling agencies process information collected by roadway tolling equipment in a back-office, and interface with customers via a customer service center. INDOT would house these activities in a single building located in Indiana. This approach would provide consistency, flexibility, and cost-efficiency if INDOT chose to augment its staff by procuring contractor support.

Figure 4-6 illustrates the functions of a combined back-office and customer service center.

Figure 4-6. Back-Office and Customer Service Center Operations



INDOT estimates that these costs would account for between 10 and 15 percent of the toll revenue. Collection costs would go down as transponder adoption rates increase and image processing technology improves.

4.12 Comply with the Payment Card Industry’s Security Standards

A statewide interstate tolling program would rely on millions of credit card transactions each year. INDOT would design all credit card and debit card processing activities to comply with the Payment Card Industry (PCI) Data Security Standard (PCI-DSS). These standards help mitigate the risk of system hacking and credit card fraud by establishing requirements for capturing, transmitting, and storing credit card information.

4.13 Provide a variety of customer service options

Customer satisfaction is an important goal of all toll agencies. A key aspect of customer satisfaction is convenience and ease of use. Therefore, INDOT would provide multiple options for ordering transponders, opening transponder accounts, paying invoices, obtaining toll road information, and interacting with customer service representatives. Examples include:

- **Website:** A website would be the most convenient, efficient, and effective self-service channel for handling most customer issues.
- **Mobile application:** A mobile application would be a small-scale version of the website with reduced payment features to minimize the exposure of credit card data.
- **Call center:** Customers would be able to speak to a customer service representative over the phone.
- **Third-party retailers:** INDOT would use local third-party retailers to provide customers with in-person access to transponders and bill payment options. For example, Hoosiers can currently purchase transponders for the Indiana Toll Road at participating CVS stores. They can also purchase transponders for the Ohio River Bridges in southern Indiana at participating Speedway and Thorntons convenience stores. Using third-party retailers would reduce costs, improve access to transponders, provide enhanced customer convenience, and increase the number of customers paying by transponder.
- **Walk-up locations:** INDOT would open a walk-up service desk at the customer service center. They would also lease storefront space to establish customer service walk-up locations in communities that are underserved by third-party retailers. These walk-up locations would be staffed by local customer service representatives capable of assisting customers in a dynamic face-to-face environment.

4.14 Expand the Use of Intelligent Transportation Systems on tolled corridors

INDOT has used Intelligent Transportation Systems (ITS) for many years to provide Hoosiers with a safer and more reliable travel experience. INDOT would expand the use of ITS on the tolled corridors to better communicate with travelers and resolve traffic incidents as quickly and safely as possible.

The following activities would also help minimize the amount of traffic that diverts to non-tolled routes when traffic slows down.

- **Install fiber optic cable along the entire length of the tolled corridors.** INDOT would use cable such as the one pictured in Figure 4-7 to connect ITS hardware to a Traffic Management Center and connect electronic tolling equipment to the tolling back office.

Figure 4-7. Fiber Optic Cable



- **Expand Hoosier Helper service.** Hoosier Helpers provide motorist assistance in Indiana's major urban areas. INDOT would expand this service along the tolled corridors. Hoosier Helpers would assist stranded motorists, provide protection at incident scenes, and assist during emergencies. By responding to non-emergency situations and coordinating with first responders, the Hoosier Helpers would minimize travel delays and reduce the burden on first responders and law enforcement personnel.

Figure 4-8. INDOT Hoosier Helpers Vehicle



- **Install traffic cameras and sensors.** Cameras and sensors would monitor traffic flow and connect to an automated system that generates an alarm within seconds of a traffic slowdown. INDOT would use the cameras to observe the incident and prepare first responders and Hoosier Helpers prior to their arrival at the scene. INDOT would also post traffic information on dynamic message signs to communicate travel times and warn travelers about upcoming delays.
- **Stage tow trucks along the tolled corridors.** INDOT would contract with a tow truck service to stage vehicles during peak travel times in areas that experience higher than normal incident rates. When a vehicle needs to be removed from the roadway, a tow truck would be standing by. This strategy would significantly decrease delay caused by breakdowns and minor traffic incidents.

- **Track the amount of time required to detect and clear an incident.** INDOT would use this information to determine staffing levels, train staff, and continuously improve travel along the tolled corridors.

4.15 Develop new roadway maintenance standards for tolled corridors

Across the U.S., maintenance standards differ on toll roads compared to non-tolled roads because driver expectations change when paying tolls. INDOT would develop new maintenance performance standards for tolled corridors. INDOT would also develop annual inspection reports and track conditions against the performance standards.



5. FINANCIAL STRATEGIES

This chapter describes how INDOT would fund the implementation of a statewide interstate tolling program. The program would be financially self-sufficient. INDOT would use toll-backed revenue bonds that do not impact Indiana's credit rating or INDOT's existing capital program. Additional financial information is provided in *Appendix D: Financial Analysis*.

5.1 Fund implementation separately from INDOT's existing program

Indiana's landmark transportation bill, HEA 1002, set a solid foundation for Indiana's transportation program. The legislation is enabling INDOT to address pavement and bridge preservation needs throughout the state. By focusing on preservation, INDOT is minimizing the long-term costs of Indiana's highways. This strategy is like maintaining your house to save money in the long run.

Given the importance of funding roadway preservation needs, INDOT would not use any existing transportation funding sources to implement tolling projects. INDOT would use toll-backed revenue bonds to cover project costs and fund the ongoing preservation of the tolled facilities. Most toll roads in the U.S. are financed this way. However, Indiana's tolling program would likely have more favorable financing terms than most new toll facilities. Financing costs are proportional to the amount of revenue risks that bond holders perceive, and I-65, I-70, and I-94 are existing interstates with a history of high and stable travel volumes. For planning purposes, INDOT has assumed interest rates on 40-year toll-backed revenue bonds would range from 4 to 5 percent.

5.2 Use non-recourse toll-backed revenue bonds that do not impact Indiana's credit rating or INDOT's cash flow

"Indiana is one of twelve states that has the highest credit rating assigned by all three independent credit rating agencies: Fitch, Moody's, and Standard & Poor's Ratings Service.⁷ These ratings enable Indiana to borrow money at attractive rates. INDOT

⁷ *State of Indiana Comprehensive Annual Financial Report for Fiscal Year Ended June 30, 2017*, prepared by the Office of the Indiana Auditor of State.

would implement a statewide interstate tolling program with toll-backed revenue bonds that do not impact this rating.

INDOT would use non-recourse toll-backed revenue bonds. These bonds are used widely by tolling agencies in the U.S. With non-recourse toll bonds, bondholders bear all the financial risks associated with future toll revenues. Neither INDOT nor the State of Indiana would serve as a financial backstop if future toll revenues were lower than projected. Therefore, the bonds would not impact Indiana's credit rating. In addition, INDOT would not be required to set aside a portion of its current budget to cover potential shortfalls in future bond service payments.

5.3 Structure a bonding program to minimize required INDOT funding

For example, consider a tolling project that takes four years to construct. If tolling begins after construction is complete, toll revenue would not be available until year five. INDOT could structure the bond proceeds to cover the contractor costs and the bond service payments that are due before tolling begins. In this example, the project would be self-funded; INDOT would not need to use existing funds.

5.4 Plan a series of bond issuances that are phased in over time as part of a consolidated program

Implementing a statewide interstate tolling program would require building numerous projects throughout the state over several years. To pay for the ongoing work, INDOT would develop a financial plan that involves multiple bond issuances for a system of tolled projects.

For example, INDOT would use the first bond offering to pay for an initial set of projects. Once these projects are complete, INDOT would toll the improved sections of interstate. INDOT would use toll revenues to pay off the initial bond issuance as well as future bond issuances under the same program. The initial issuance would be structured so toll revenues would be greater than the debt service payments. Therefore, INDOT would use future toll projects and revenues to bond and construct future phases as a pooled system. INDOT would continue this phased approach until the entire program is funded.

Combining bonds and toll revenue from individual projects into a single program would decrease financial risk for bondholders due to project and regional diversification, minimize financing costs, and provide INDOT with flexibility in how it phases in a statewide interstate tolling program.

5.5 Consider Transportation Infrastructure Finance and Innovation Act loans when widening rural interstates

The federal Transportation Infrastructure Finance and Innovation Act (TIFIA) program helps transportation agencies build large projects of regional and national significance.⁸ Agencies can apply for a TIFIA loan that covers up to one third of project's cost and pay back the loan with future toll revenue. The program provides loans that have better financial terms than are possible through the bond market. Examples include lower interest rates and the deferral of repayment for up to five years after a project is complete. If the interstate tolling program is paired with the border-to-border widening of rural interstates outside of I-465, INDOT would consider applying for rural TIFIA loans, which have even lower borrowing costs, to help fund the program.

5.6 Consider a leasing option as part of an overall financial plan

In 2006, Indiana signed a lease for the Indiana Toll Road. As part of the lease, Indiana received a lump sum payment of \$3.8 billion, and a private concessionaire received the rights to collect tolls for 75 years.⁹ The lease agreement prescribed a toll rate framework and performance requirements for roadway operations and maintenance. It also ensured Hoosiers were not impacted when the original concessionaire declared bankruptcy and transferred the lease to a new concessionaire. Indiana used proceeds from the lease to fund a 10-year statewide transportation program referred to as "Major Moves."

INDOT would evaluate a similar approach as part of a comprehensive financial plan. For example, if Indiana leased an initial section of a tolled interstate, it could use the up-front proceeds to pay for subsequent projects. This approach would decrease the amount of bonding needed to implement a statewide interstate tolling program.

⁸ *Transportation Infrastructure Finance and Innovation Act 2016 Report to Congress*, prepared by the U.S. Department of Transportation, August 11, 2016.

⁹ *Indiana Toll Road Concession and Lease Agreement by and between the Indiana Finance Authority and the ITR concession Company LLC*, April 12, 2006.



6. ENVIRONMENTAL REVIEW STRATEGIES

This chapter describes how INDOT would review the environmental benefits and impacts of potential toll projects. INDOT would follow the applicable environmental process when implementing a tolling project. This approach would enable stakeholders and the public to participate in the decision-making process. Additional environmental information is provided in *Appendix B: Engineering & Environmental Analysis*.

6.1 Complete environmental reviews in a manner consistent with other INDOT projects

INDOT has standard procedures for reviewing the environmental impacts and benefits of potential transportation projects. This approach reflects industry best practices and state and federal regulations. It also provides consistency for integrating residents, businesses, and local public agencies into the transportation decision-making process. INDOT would use these standard procedures to conduct environmental reviews for tolling projects.

Implementing a statewide interstate tolling program would entail implementing numerous individual projects throughout the state. INDOT would tailor the specifics of the environmental review process to the scope and location of each independent project. In general, the environmental review process would include the following steps:

- Define the need for the project;
- Develop alternatives for addressing this need;
- Analyze the benefits and impacts of each alternative;
- Identify a preferred alternative or solution; and
- Hold public meetings, coordinate with other government agencies, and incorporate input into the project.

6.2 Proactively consider environmental justice

The term environmental justice (EJ) refers to an equitable and fair distribution of a project's benefits and burdens. Federal EJ guidelines require DOTs to evaluate how low-income and/or minority populations bear the burden of transportation projects relative to the broader population. These guidelines apply to all projects, but are of

particular interest on tolling projects because they entail out-of-pocket user fees and impact travel patterns.

As part of administering and delivering a federal-aid transportation program, INDOT maintains a consistent focus on EJ issues. The statewide tolling program would be no different. When designing a tolling program, INDOT would proactively evaluate potential EJ issues and identify appropriate minimization and mitigation strategies, as needed. As part of the environmental review process, INDOT would develop an outreach program to meaningfully engage with low-income and/or minority communities about the potential costs, benefits, and impacts of interstate tolling.



7. IMPLEMENTATION STRATEGIES

This chapter defines strategies that INDOT would use to implement a statewide interstate tolling program. INDOT would use a mixture of federal programs and procurement options to implement the program in phases. INDOT would leverage the program to modernize I-65, I-70, and I-94 and enhance Indiana's workforce.

7.1 Take advantage of all relevant federal programs that enable interstate tolling

Federal law provides options for tolling existing interstates. The broadest option is referred to as the Section 129 General Tolling Program (or Section 129 Program for short).¹⁰ Indiana used the Section 129 Program on the Ohio River Bridges in southern Indiana. This program enables states to convert existing toll-free bridges to toll bridges if they are reconstructed. It also provides flexibility for how states can use toll revenue. Once states cover the costs associated with the tolled bridge, they can use additional toll revenue for other transportation purposes.

INDOT has confirmed with the Federal Highway Administration that Indiana has federal authority to toll existing interstates under the Section 129 Program. INDOT would use this program as the backbone for a statewide interstate tolling program. Under this program, INDOT could toll an interstate bridge after it is reconstructed as part of the ongoing bridge preservation program or widened as part of a roadway widening project.

The main disadvantage of the Section 129 Program is that INDOT would have to implement a statewide tolling program piece-by-piece. Tolling on the interstates would have to coincide with significant bridge work. Many of Indiana's interstate bridges are in excellent condition and will not need significant work for several years.

¹⁰ "Section 129 General Toll Program Q&A", Federal Highway Administration Center for Innovative Finance Support, accessed August 31, 2018, https://www.fhwa.dot.gov/ipd/tolling_and_pricing/tolling_pricing/section_129_faqs.aspx.

INDOT would also pursue the use of the Interstate System Reconstruction and Rehabilitation Pilot Program.¹¹ This pilot program enables states to toll an entire interstate corridor to fund its reconstruction or rehabilitation. States must invest the toll revenue back into the corridor from which it was collected. This pilot program is only available to three states. Currently, there are two pilot slots available.

INDOT would also explore the federal Value Pricing Pilot Program.¹² The U.S. Congress established this program in 1991 to enable tolling as a congestion management tool in urban areas. The program requires agencies to use variable toll rates. For example, an agency could use a higher toll rate during rush hour than during other parts of the day. Under this program, tolling can begin without any construction activities. The pilot program is limited to 15 slots. Currently, all 15 slots are taken. However, the Federal Highway Administration can replace inactive slot holders. INDOT would assess the potential for tolling to manage congestion and improve interstate mobility in the Indianapolis region and in northwestern Indiana. If tolling is a viable congestion management tool, INDOT would apply for the Value Pricing Pilot Program.

7.2 Work to update state law to enable an efficient tolling program

INDOT would review state law for items that are relevant to an efficient and effective statewide tolling program. INDOT would identify statutes relevant to successful implementation of a statewide tolling program and work with elected officials to explore options for updating them.

7.3 Make all necessary roadway and bridge improvements when widening an interstate

If tolling is used to fund the border-to-border widening of I-65 and I-70 outside of I-465, INDOT would take advantage of the opportunity to rehabilitate and modernize these interstates. When widening an interstate, INDOT would also consider the following when possible:

- Replace the pavement in existing lanes;

¹¹ “Interstate System Reconstruction and Rehabilitation Pilot Program” Federal Highway Administration Center for Innovative Finance Support, accessed August 31 2018, https://www.fhwa.dot.gov/ipd/tolling_and_pricing/tolling_pricing/interstate_rr.aspx.

¹² “Value Pricing Pilot Program”, Federal Highway Administration Office Operations, accessed August 31, 2018, https://ops.fhwa.dot.gov/congestionpricing/value_pricing/index.htm.

- Replace, widen, and strengthen shoulders;
- Add guardrail;
- Improve drainage;
- Conduct all preservation work on the bridges that carry the interstate;
- Conduct all preservation work on the bridges that cross over the interstate;
- Raise overhead bridges;
- Replace signs;
- Replace the pavement on interstate ramps;
- Improve mobility at interchanges; and
- Install a fiber-optic communications network.

In addition, INDOT would evaluate opportunities to further improve truck safety and mobility along the tolled corridors. For example, INDOT is participating in an eight state program to improve truck parking along interstates in the Midwest. INDOT would explore additional opportunities for implementing a comprehensive smart truck parking system.

This strategy would enable INDOT to modernize I-65, I-70, and I-94 as part of a statewide interstate tolling program.

7.4 Separate toll gantry installation from roadway and bridge contracts

A statewide interstate tolling system would require the construction of toll gantries at around 70 locations across the state. INDOT would install four gantries at each location: two in each direction. Gantry installation is less common than bridge and roadway construction and requires a different set of skills. In addition, installing the gantries and related infrastructure correctly is critical to the overall success of any tolling program. Therefore, INDOT would execute gantry construction contracts separate from roadway and bridge construction contracts. This strategy would place a heavier burden on INDOT to coordinate between multiple contractors working in the same location. However, it would save money in the long run because roadway contractors would not be required to add gantry installation capabilities to their teams for a series of single projects. More importantly, this strategy would improve the consistency of the gantries by minimizing the number of contractors that are responsible for this critical part of the tolling system.

7.5 Separate toll operations support into two contracts

To support a statewide interstate tolling program, INDOT would procure the following services:

- **Lane system installation and operations.** The lane system consists of the equipment that captures information about the vehicles passing through a toll zone. Examples include the cameras and sensors described in Chapter 4 of this document.
- **Back office system installation and operations.** The back office system processes information collected by the lane system, manages transponder accounts, reads license plate images when a vehicle does not have a transponder, and generates invoices.
- **Customer service center operations.** The customer service center is the face and the voice of the tolling operation. Customer service center staff interact directly with the public, address their concerns, and answer questions.

INDOT would organize these components into two contracts. The first contract would cover the installation and operation of the lane system. The second would combine the back office system and customer service center. INDOT would combine these two components because they require close coordination and would be co-located in a single facility. This strategy would enable INDOT to select the best available contractor for each contract. Operating the lane system requires different expertise than operating the back office system and customer service center.

7.6 Leverage a statewide interstate program to enhance Indiana's workforce

A statewide interstate tolling program paired with major interstate improvements would result in numerous construction projects costing billions of dollars over multiple years. INDOT would leverage this program to enhance Indiana's workforce.

For example, INDOT would encourage disadvantaged business enterprises (DBEs) to participate in the program. INDOT has a formal program to ensure that DBEs have an equal opportunity to participate in federally-funded contracts regardless of race, color, sex, or national origin.¹³ INDOT certifies companies as DBEs, establishes DBE

¹³ *Indiana Department of Transportation Disadvantaged Business Enterprise Program Manual*, September 21, 2016.

participation goals, and tracks DBE participation. INDOT would apply this program and participation goals at the time of contracting to the tolling program.

Another factor to consider with a construction program of this size is the use of Indiana labor and materials. INDOT has found that natural market forces drive in-state participation in its capital program. For example, in fiscal year 2017, 96 percent of the value of INDOT's construction projects went to Indiana firms.¹⁴ INDOT anticipates this trend will continue and that market forces would drive in-state participation in a statewide interstate tolling program.

A final consideration is training the workforce that would be required to implement a statewide interstate tolling program. INDOT would take advantage of the training opportunities provided by Indiana's Next Level Jobs program. This program provides training assistance in several high-growth fields including building and construction.¹⁵

7.7 Collaborate with organizations and programs that use technologies related to open road tolling

The equipment used for open road tolling has other commercial uses. To leverage these capabilities, INDOT would look for opportunities to collaborate with other organizations and programs to improve the cost effectiveness of a statewide interstate tolling program. One potential opportunity is to coordinate with parking vendors that use transponders like the ones used for tolling. For example, SunPass is the electronic toll collection system used in Florida. SunPass has partnered with the Miami Dolphins so fans can use their SunPass transponders to pay for parking at the stadium. INDOT would investigate using a similar approach with parking vendors in Indiana's metropolitan areas. Coordination with parking vendors would provide an added benefit to drivers and improve tolling operations because many parking facilities use outdated transponders that interfere with modern tolling equipment.

7.8 Sequence implementation based on federal program restrictions, corridor needs, contractor capacity considerations, and financial considerations

Due to the limitation of the federal tolling programs described above, tolling could not begin simultaneously on all of I-65, I-70, and I-94. Therefore, INDOT would develop a phased sequencing plan based on the federal tolling guidelines. For example, if INDOT

¹⁴ *Tolling Feasibility Study*, prepared for the Indiana Department of Transportation by HDR, Inc., October 31, 2017.

¹⁵ "Next Level Jobs", accessed August 31, 2018, <https://www.nextleveljobs.org/>.

used the Section 129 Program as the basis for tolling, tolling at specific locations would be tied to bridge needs. If tolling were paired with border-to-border widening I-65 and I-70 outside of I-465, the sequencing plan would reflect the relative safety, mobility, and preservation needs of these corridors.

The sequencing plan would also reflect contractor availability. INDOT estimates border-to-border widening I-65 and I-70 outside of I-465 would cost around \$4.65 billion in current 2018 dollars. INDOT would optimize the timing and cost-effectiveness of the program by dividing the work into packages.

INDOT would also evaluate different construction procurement options to achieve an optimal mix of cost, schedule, and risk. For example, INDOT could use a traditional design-bid-build approach for widening a stretch of rural interstate to the inside median, and a design-build approach for a project that includes more complex interchange improvements.

Finally, the sequencing plan would adhere to the financial plan described in the previous chapter. Based on estimated project costs compared to potential revenue, INDOT would have flexibility in how it sequences the program. INDOT would develop a fiscally-responsible sequencing plan that does not impact Indiana's bond rating or INDOT's existing capital program.

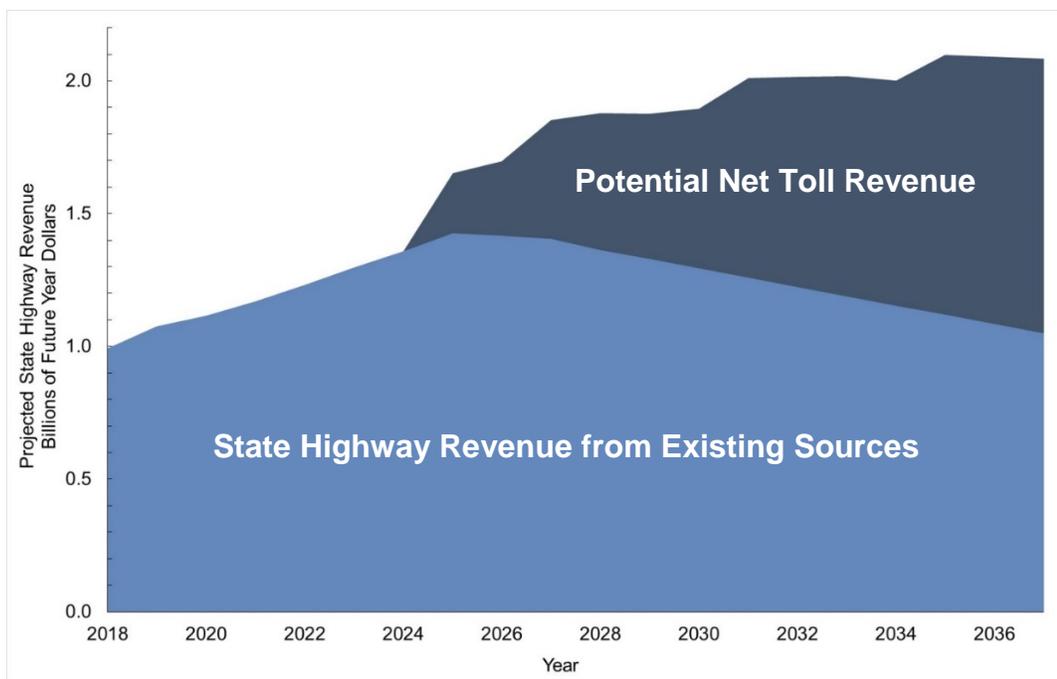


8. CONCLUSION

Indiana has not made the decision to implement a statewide interstate tolling program. However, based on Indiana HEA 1002, INDOT was directed to investigate tolling as a possible way to fund major interstate improvements.

Tolling could also be part of a long-term, financially sustainable transportation program for the state of Indiana. For example, Figure 8-1 provides one example of what potential toll revenue could look like. In developing Figure 8-1, it was assumed that tolling could begin in 2024. This is an example timeframe developed for planning purposes and is not meant to suggest that a toll implementation timeframe has been established. Additional information on how this example was developed is provided in *Appendix D: Financial Analysis*.

Figure 8-1. Potential Toll Revenue Compared to Revenue from Existing Sources¹⁶



¹⁶ The revenue from existing sources does not include Next Level Connections funds. The toll revenue is based on the following rates per mile for vehicles paying with a transponder: \$0.05 for vehicles with 2 axles, \$0.07 for vehicles with 3 and 4 axles, and \$0.20 for vehicles with 5 or more axles. It is assumed that vehicles without a transponder would be charged a 50 percent surcharge. The graph shows potential net revenue, which is the amount of revenue remaining after revenue leakage and toll collection costs.

Given the funding potential of interstate tolling, INDOT has taken a critical look at how it **could** implement a statewide interstate tolling program **if** Indiana decides to proceed.

Implementing a statewide interstate tolling program would be complicated. It would also take time. It would take years to collect the first toll and decades to complete a comprehensive statewide program. INDOT has evaluated how it could address these challenges. This Strategic Plan represents the results of this effort.

The Plan starts by describing open road tolling, which enables drivers to pay tolls while traveling at full speed. **There would be no toll booths.** Drivers would not have to stop or even slow down.

The plan then presents potential strategies for implementing tolling on I-65, I-70, and I-94. Following are the highlights:

- **Toll rate strategies.** Market driven toll rates would be in line with rates used by toll agencies throughout the U.S., vary by vehicle type, and balance revenue and traffic diversion.
- **Operational strategies.** The tolling system would reflect best practices and trends in open road tolling, enable tolling while vehicles travel at full speed, and be user-friendly.
- **Financial strategies.** The program would be financially self-sufficient. INDOT would use toll-backed revenue bonds that do not impact Indiana's credit rating or INDOT's existing capital program.
- **Environmental strategies.** INDOT would use applicable environmental processes, which enable stakeholders and the public to participate in the decision-making process.
- **Implementation strategies.** INDOT would use a mixture of federal programs and procurement options to implement the program in phases. INDOT would leverage the program to modernize I-65, I-70, and I-94 and enhance Indiana's workforce.

This Strategic Plan provides a practical, data-driven, and financially sound approach for how INDOT could implement a statewide interstate tolling program. The Plan provides important information as Indiana considers major interstate improvements and options for maintaining a long-term, financially sustainable transportation program.

NOTES

- The analysis contained within this document addresses potential tolling along I-65, I-70, I-94. However, no final decisions have been made about if and where to toll. Additionally, tolling may be considered along other interstates (e.g., I-64, I-74, etc.).
- INDOT evaluated the potential to pair tolling with the widening of I-65 and I-70 outside of I-465 to six lanes border-to-border. The analysis assumes that widening these corridors would include bridge reconstruction work that meets the legal basis for tolling under the federal Section 129 General Tolling Program.
- To support the strategic planning process, INDOT analyzed the concept of operations, traffic & revenue, engineering & environmental, financial, and traffic implications related to the implementation of tolling at the statewide level.