

Agriculture, Road Conditions, and Road Funding

Farm Policy Study Group

December 6, 2016



Charge

- Estimate the spending gap for local road and bridge rehab for 20 years
 - Needs
 - Spending
 - Gap
- Identify potential state and local funding mechanisms to fill the funding gap
- Identify ways local governments can maximize the utility of limited resources
- Next steps



Road and Bridge Needs

Focus Groups



Focus Groups

- 6 focus groups in November/December 2015
- Frankfort, Morristown, Delaware County, Milroy, Avilla, and Mt. Vernon
- Participants from 24 counties



Who

- Farmers – grain, specialty crop, livestock
- Processors
- Truckers
- Commercial Haulers
- State elected officials
- Local elected officials (commissioners, highway dept., plan commission, surveyor)
- Other
 - Ethanol
 - Grain marketing
 - Co-op
 - Paving
 - Farm drainage
 - School bus driver
 - Stone quarry
 - EMS/Fire



Responses

- Costs time and \$ to detour around impediments
- Affects other roads
- State highway vs. local infrastructure
- Roundabouts (curbs)
- Rough pavement
- Crossings: visibility
- Crossings and bridges: peaked/troughed

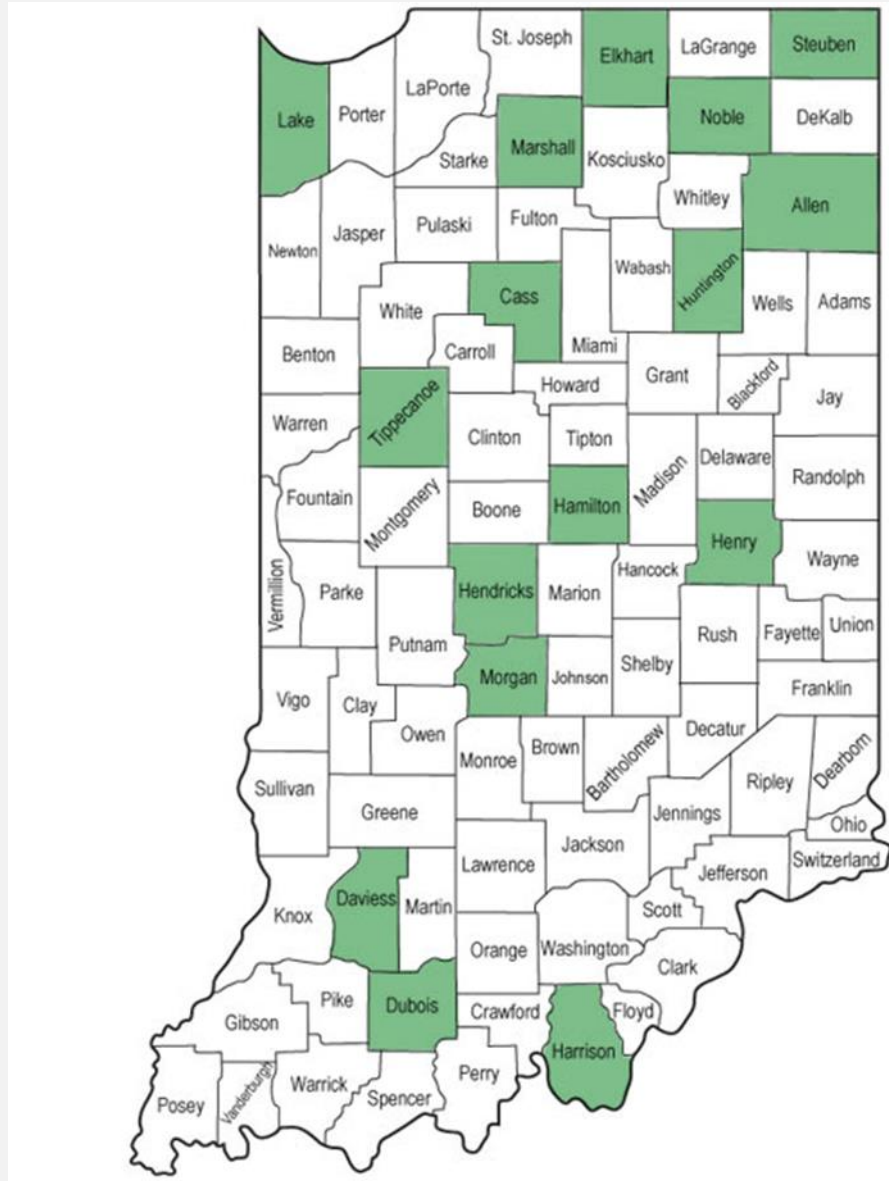


Responses

- Drainage around roads
- Effective pavement width (no clearance past pavement, obstacles, etc.)
- Conflicts with urban and suburban road users
- Concerns about short-sighted repair strategy
- Concerns about using same revenue sources for other types of transportation needs
- Varied responsiveness to problems – maintenance needs vs. bigger fixes



Study Counties





Road and Bridge Needs



PASER – Pavement Surface Evaluation and Rating

Rating	Definition	Visible Distress	Treatment Measures
10	Excellent	None	New construction
9	Excellent	None	Recent overly. PDR, FDR or reconstruction
8	Very Good	No longitudinal cracks except reflection of paving joints. Occasional transverse cracks, widely spaced (40' or greater). All cracks sealed or tight (open less than ¼")	Recent sealcoat or preservation application. Little or no maintenance required.
7	Good	Very Slight or no raveling. Surface shows some traffic wear. Minor longitudinal cracks due to reflection or paving joints. Transverse cracks spaced ~10' or more apart, little or slight crack raveling. No patching or few patches.	First signs of aging. Maintain with crack filling or crack sealing.
6	Good	Slight raveling and traffic wear. Longitudinal cracks, some spaced less than 10'. First sign of block cracking. Slight to moderate flushing or polishing. Occasional patching.	Shows signs of aging. Sound structural condition. Could extend life sealcoat.
5	Fair	Moderate to severe raveling. Longitudinal and transverse cracks show first signs of slight raveling and secondary cracks. First signs of longitudinal cracks near pavement edge. Block cracking. Extensive to severe flushing or polishing. Some patching or edge wedging in good condition.	Surface aging. Sound structural condition. Needs minor patching or wedging and surface seal or HMA overlay.
4	Fair	Severe surface raveling. Multiple longitudinal and transverse cracking with slight raveling. Longitudinal cracking in wheel path. Severe block cracking. Patching in fair condition. Slight rutting or distortions.	Significant aging and in need of strengthening. Needs major patching or wedging and surface seal or HMA overlay.
3	Poor	Closely spaced longitudinal and transverse cracks often showing raveling and crack erosion. Severe	Needs patching and repair prior to major overlay (4"+) or reconstruction / reclamation.



County	Road Way Miles	% of Road Miles										Total	Paved Miles	Gravel %	Gravel Miles
		PASER Rating													
		1	2	3	4	5	6	7	8	9	10				
Allen	1293	0	2	0	8	0	38	0	40	0	12	100	1254	3	39
Cass	766	1	4	9	16	17	17	21	8	7	0	100	674	12	92
Daviess	800	1	0	0	5	5	10	36	27	15	1	100	360	55	440
Dubois	659	0	0	0	1	11	28	30	16	9	5	100	527	20	132
Elkhart	1137	0	6	0	3	16	41	20	10	4	0	100	1069	6	68
Hamilton	592	0	0	1	0	11	29	42	5	12	0	100	568	4	24
Harrison	820	0	0	1	7	16	17	17	32	5	5	100	787	4	33
Hendricks	770	0	2	10	27	24	16	12	4	0	5	100	770	NR	0
Henry	753	1	8	20	18	18	12	14	8	1	0	100	678	10	75
Huntington	655	0	0	0	3	3	2	49	37	6	0	100	603	8	52
Lake	529	5	10	17	18	15	15	8	8	3	1	100	497	6	32
Marshall	814	9	18	36	24	7	5	1	0	0	0	100	757	7	57
Morgan	678	0	4	30	42	10	4	5	5	0	0	100	664	2	13
Noble	808	0	2	4	8	20	39	18	6	3	0	100	728	10	81
Steuben	644	5	7	8	25	25	6	6	6	6	6	100	419	35	225
Tippecanoe	600	1	1	3	6	18	32	28	8	1	2	100	456	24	144
Total	12318	1.4	4.0	8.7	13.2	13.5	19.5	19.1	13.7	4.5	2.3	100	10,811	13.7	1507

NR – None reported



Treatment Costs – LTAP Report SP-28-2013

Paser Rating		Cost/mile	Expected Life (yrs)
Initial	Final		
1	10	\$ 112,000	20
2	10	\$ 112,000	20
3	10	\$ 112,000	20
4	10	\$ 82,000	14
5	6	\$ 15,000	7

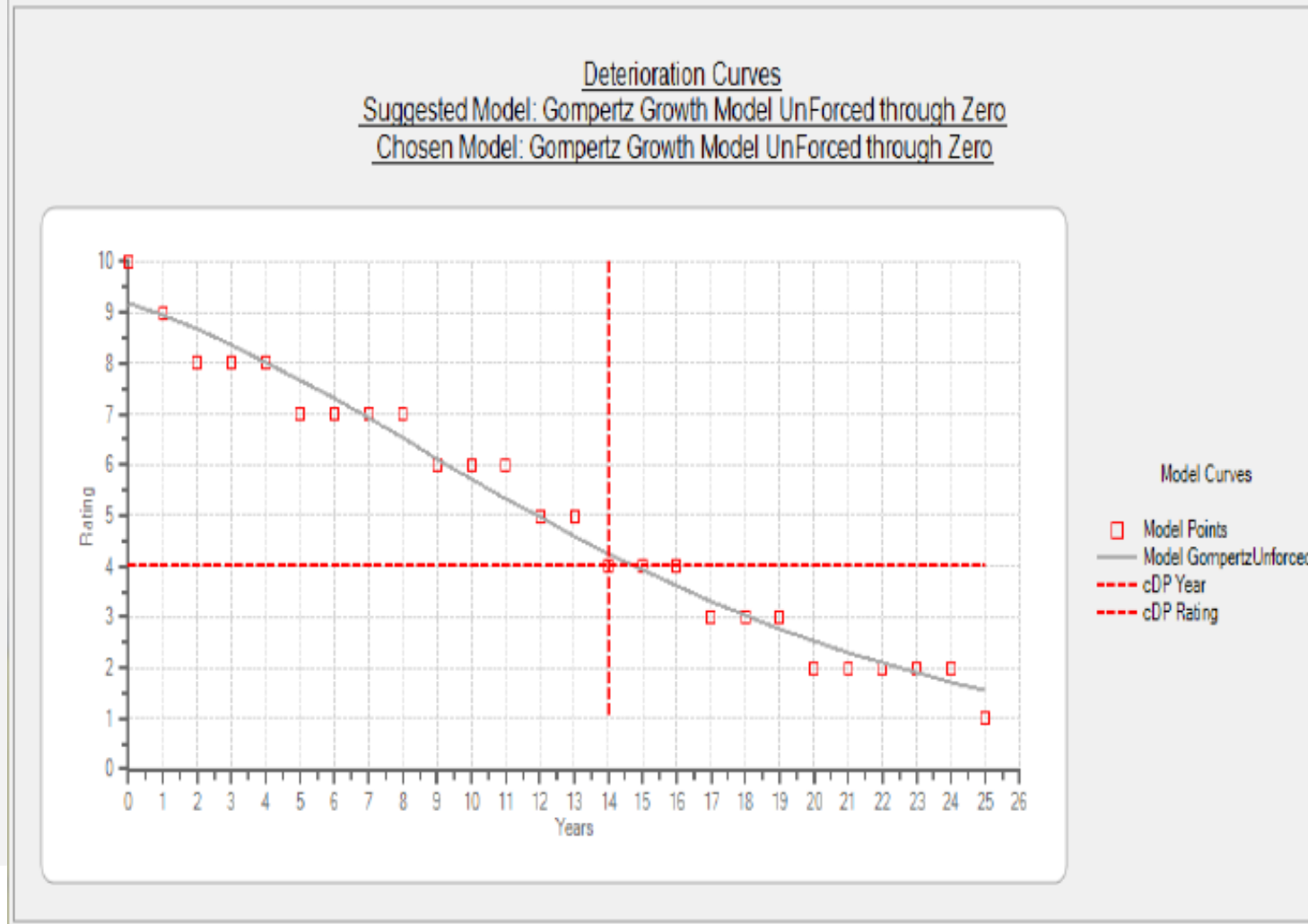


Future Treatment Costs

PASER Rating Improvement	Initial cost	Treatment year	Future Cost - 3% annual inflation
4 to 10	82,000	14	\$124,032
5 to 6	15,000	7	\$18,448
5 to 6	15,000	14	\$22,688
5 to 6	15,000	19	\$26,303



Deterioration Curve for Pavements



Years to PASER Rating 5

Years to PASER Rating 5

Paser Rating	Miles	Time to Threshold (yrs)
1	136	-
2	447	-
3	919	-
4	1407	-
5	1401	-
6	2322	2.75
7	1862	5.25
8	1611	8
9	408	11
10	298	12

Paser Rating		Year	Cost
Initial	Final		
1	10	0	\$ 15,187,491
5	6	13	\$ 3,076,666
Total			\$ 18,264,158
Paser Rating		Year	Cost
Initial	Final		
2	10	0	\$ 50,037,501
5	6	13	\$ 10,136,546
Total			\$ 60,174,047
Paser Rating		Year	Cost
Initial	Final		
3	10	0	\$ 102,974,122
5	6	13	\$ 20,860,393
Total			\$ 123,834,514
Paser Rating		Year	Cost
Initial	Final		
4	10	0	\$ 115,376,903
5	6	13	\$ 31,924,009
Total			\$ 147,300,912



Represents 10,811 miles

Statewide in counties there are approximately 56,700 miles of paved roads.

To get state costs the 16 county number is prorated.

**20 year need for paved roads:
~ \$4 billion**

Distributing the need over 20 years: ~ \$204 Million/Year



County	20 Year Estimated Funding Need for Pavements
Allen	\$ 64,750,000
Cass	\$ 51,100,400
Daviess	\$ 20,900,242
Dubois	\$ 29,140,900
Elkhart	\$ 67,100,200
Hamilton	\$ 33,300,200
Harrison	\$ 43,600,900
Hendricks	\$ 58,870,000
Henry	\$ 59,600,000
Huntington	\$ 34,490,000
Lake	\$ 44,302,000
Marshall	\$ 88,610,400
Morgan	\$ 68,500,100
Noble	\$ 47,740,700
Steuben	\$ 34,000,300
Tippecanoe	\$ 29,440,800
Total	\$ 775,447,142



One time funding to raise pavement to a minimum of PASER 6

~\$1.6 Billion



Road Costs Summary

Need to Upgrade Network Initially:

~ \$1.6 billion

20-Year Need: ~\$4.1 Billion

Annual Need for 20 years: ~\$204 Million



Bridges

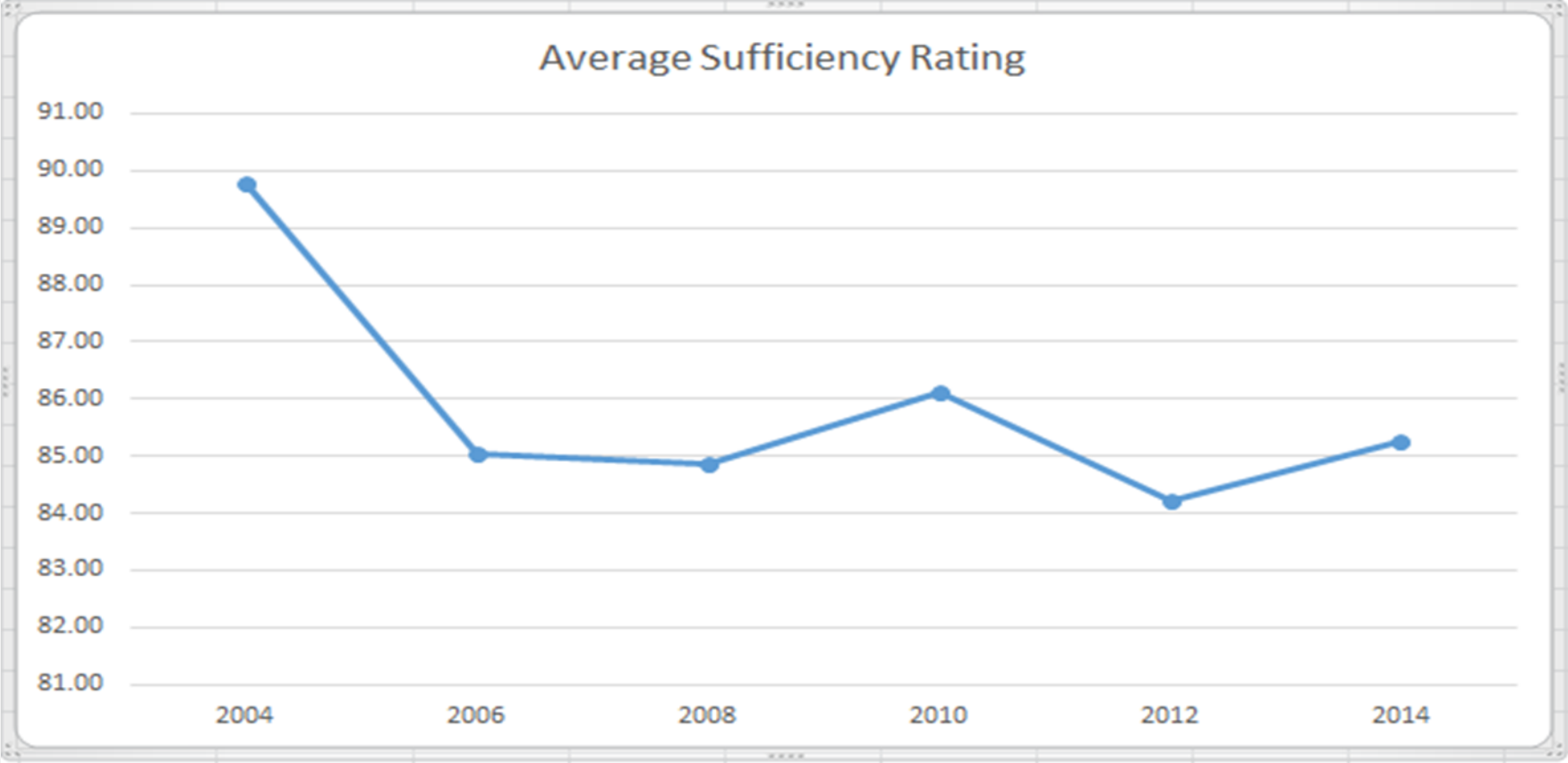
- Information obtained from FHWA Bridge Database
- Unit Repair Costs from INDOT
- Calculated cost to fix structurally deficient bridges and replace functionally deficient bridges.



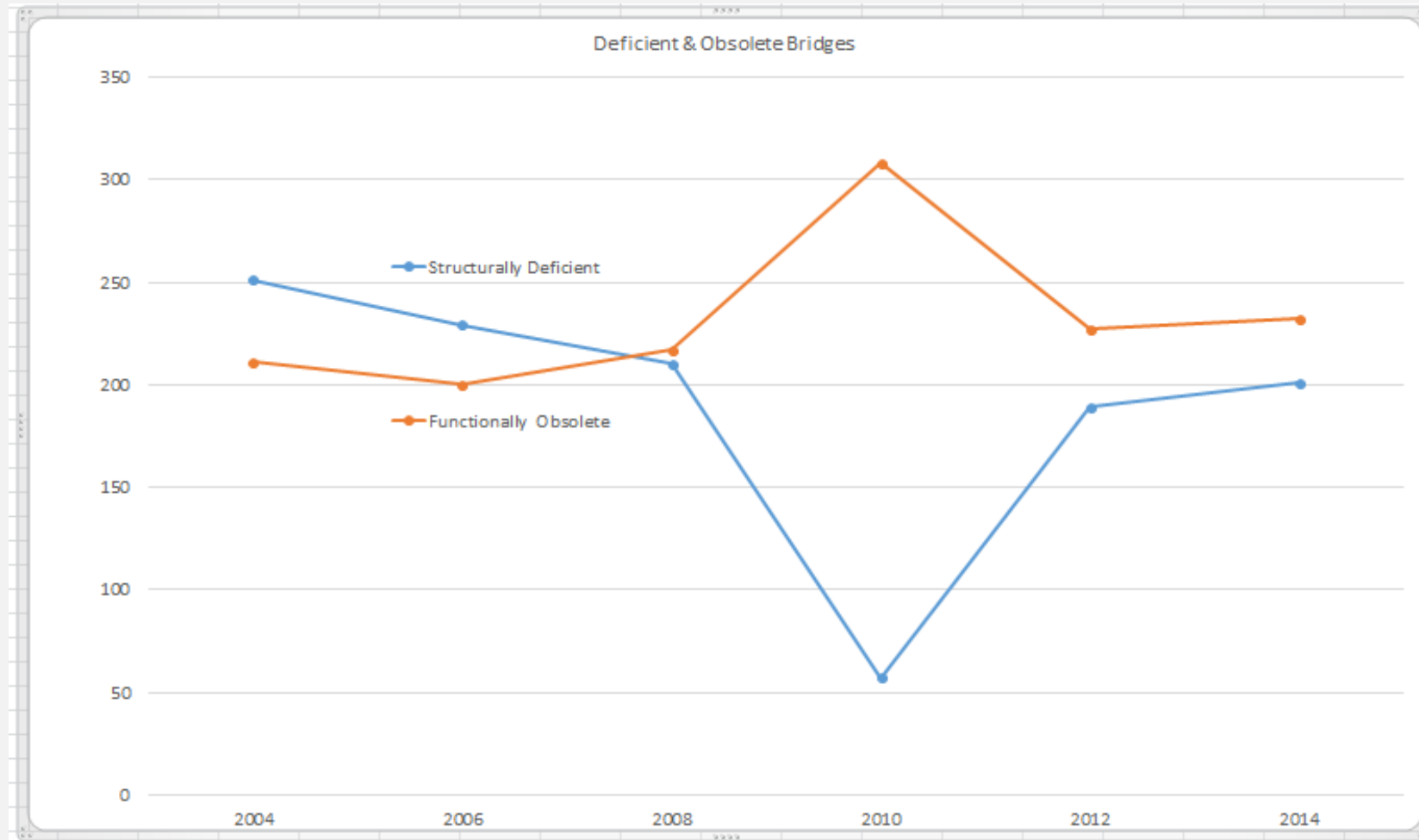
	# of Bridges	# Structurally Deficient	# Functional Obsolete	Repair Cost Deficient	Repair Cost Obsolete	Total Repair Cost
Allen	390	44	29	\$30,780,446	\$49,154,170	\$79,934,617
Cass	121	3	1	\$1,233,406	\$204,088	\$1,437,495
Daviess	125	4	20	\$342,461	\$19,422,965	\$19,765,427
Dubois	164	14	16	\$7,070,533	\$14,290,970	\$21,361,504
Elkhart	172	14	24	\$7,367,827	\$38,959,649	\$46,327,477
Hamilton	305	0	32	\$0	\$50,964,987	\$50,964,987
Harrison	74	0	6	\$0	\$5,742,640	\$5,742,640
Henry	142	4	10	\$2,618,903	\$4,309,424	\$6,928,328
Hendricks	240	19	39	\$17,381,637	\$32,401,553	\$49,783,191
Huntington	114	3	4	\$3,819,041	\$8,604,406	\$12,423,448
Lake	178	22	32	\$26,689,657	\$67,911,258	\$94,600,915
Marshall	116	9	4	\$9,921,710	\$5,415,501	\$15,337,211
Morgan	140	22	14	\$18,177,422	\$10,334,543	\$28,511,965
Noble	64	13	2	\$13,362,336	\$1,898,136	\$15,260,472
Tippecanoe	208	14	14	\$9,519,563	\$25,404,653	\$34,924,216
Totals	2602	185	247	\$148,284,948	\$335,018,952	\$483,303,901
Averages		7.1%	9.5%	\$801,540	\$1,356,352	
Local bridges in the state	13,090					



Bridge Deterioration



Deficient and Obsolete Bridges



Statewide Bridge Cost Summary

Structurally Deficient ~734 million

Functionally Obsolete ~1.6 billion

Current Estimated Repair Cost ~2.3 billion

20-year estimate is difficult to determine due to lack of bridge deterioration curves.



Paved to Gravel

- **Some agencies are using this approach**
 - Data not available to determine magnitude
- **Poor pavements**
 - 30% of pavement is below a PASER 3
 - Low traffic volume, AADT < 100
- **Costs**
 - \$42,000 per mile (initial installation)
 - Annual maintenance is \$5,000 per mile
 - 20-year cost to maintain current gravel roads (9,240 miles) is \$1.2 Billion



Agricultural equipment and Roads

- Limited ROW
- Improper Drainage
- Pavement strength – PASER < 4
- Frost Laws



Bridge Deficiencies

- **Narrow Bridges – Functionally Obsolete**
 - 59 bridges, 3% of bridges in study counties less than 18 ft. wide
- **Reduced Load Capacities – Structurally Deficient**
 - 138 bridges, 5% of bridges in study counties with rated capacity less than 15 tons
- **Bridge replacement is the solution**
 - Cost is dependent on replacement size and location



Bridge Examples



Bridge Examples



Bridge Examples



Road and Bridge Spending



Annual Road and Bridge Rehab Spending

- County Highway Operations Reports, Section III
 - Roads: “Rehabilitation” and “Resurfacing”
 - Bridges: “Rehabilitation”
- Spending
 - Road Rehab: \$119 Million – Annual
\$2.4 Billion – 20 Years
 - Bridge Rehab: \$126 Million – Annual
\$2.5 Billion – 20 Years

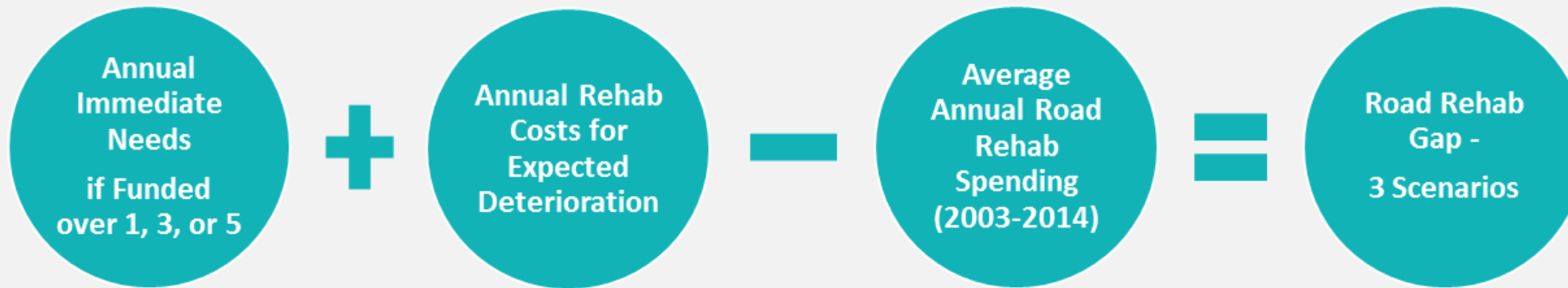


Road and Bridge Spending Gap



Funding Gap – Road Rehab

- 3 scenarios
- 14 counties with good spending data
- Used relative paved road miles to estimate state needs



Funding Gap – Road Rehab

- Gap for Scenario 1 – Immediate Needs in 1 Year
 - Year 1 = **-\$1.5 Billion**
 - Years 2-20 = **-\$27 Million**
- Gap for Scenario 2 – Immediate Needs in 3 Years
 - Years 1-3 = **-\$487 Million**
 - Years 4-20 = **-\$33 Million**
- Gap for Scenario 3 – Immediate Needs in 5 Years
 - Years 1-5 = **-\$285 Million**
 - Years 6 – 20 = **-\$36 Million**



Funding Gap – Bridge Rehab

- 3 scenarios
- 15 counties with good spending data
- Used relative number of classified bridges to estimate state needs
- No good numbers for estimating costs associated with deterioration



Funding Gap – Bridge Rehab

- Gap for Scenario 1 – Immediate Needs in 1 Year
 - Year 1 = **-\$2.2 Billion**
 - Years 2-20 = **Rehab to address deterioration**
- Gap for Scenario 2 – Immediate Needs in 3 Years
 - Years 1-3 = **-\$651 Million - Deterioration**
 - Years 4-20 = **Rehab to address deterioration**
- Gap for Scenario 3 – Immediate Needs in 5 Years
 - Years 1-5 = **-\$340 Million - Deterioration**
 - Years 6 – 20 = **Rehab to address deterioration**



Funding Gap – Summary

- Gap for Scenario 1 – Immediate Needs in 1 Year
 - Year 1 = **-\$3.7 Billion**
 - Years 2-20 = **-\$27 Million – Rehab for bridge deterioration**
- Gap for Scenario 2 – Immediate Needs in 3 Years
 - Years 1-3 = **-\$1.1 Billion - Rehab for bridge deterioration**
 - Years 4-20 = **-\$33 Million - Rehab for bridge deterioration**
- Gap for Scenario 3 – Immediate Needs in 5 Years
 - Years 1-5 = **-\$625 Million- Rehab for bridge deterioration**
 - Years 6 – 20 = **-\$36 Million- Rehab for bridge deterioration**



Funding Gap – Summary

- County needs, spending and gaps vary
- This analysis only county road and bridge rehab, not:
 - New roads/capacity
 - New bridges (very rare)
 - Maintenance and repair (which can be quite variable due to winter weather)
 - Administration or unclassified



Compared to Other Studies

- Current study
 - County roads and bridges only
 - Rehab (and gravel maintenance- needs only)
 - 16 counties as basis, secondary data
 - Paser 6, lasting fixes
- Others



Funding Policy

- 2016 Legislature
 - Provided access to LOIT reserves
 - Allowed increase of LOHUT/gave access to cities
 - Community Crossings Matching Grant Program
 - Strongly incentivized asset management



Additional Options

- Adjustments to gas/diesel taxes
- VMT tax
- Local options
 - Additional funding
 - Improving efficiency and effectiveness



Indiana Infrastructure Funding Projections 2016 – 2035



Introduction

- Factors influencing fuel consumption
 - Number of vehicles
 - Fuel economy
 - Vehicle miles traveled
- Factors influencing tax revenue
 - Excise tax rate
 - Sales price of gasoline and diesel
- Importance of the rates of change in determining future outcomes
 - Fuel economy is outpacing increase in vehicle miles traveled!

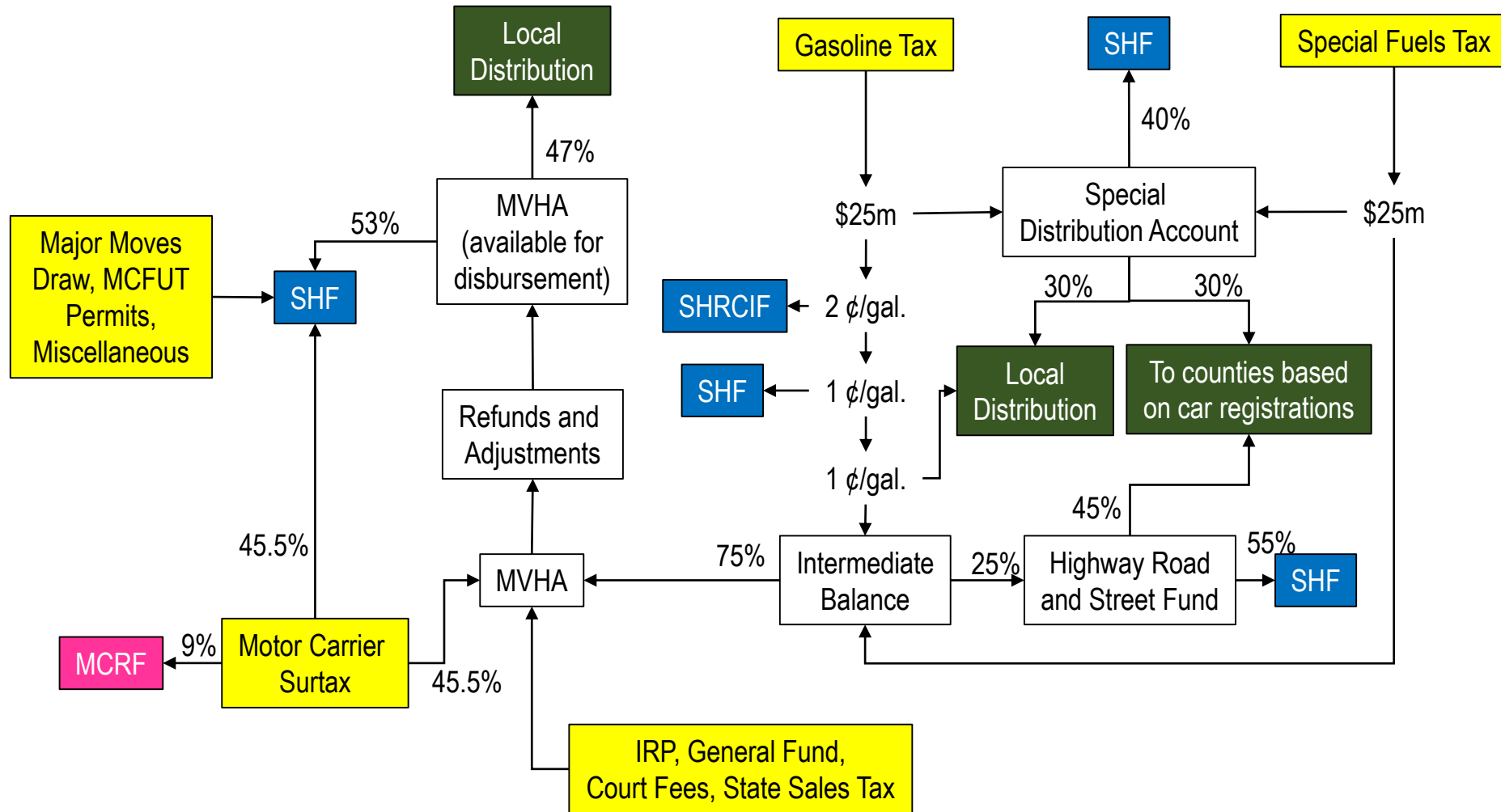


Approach

- Time frame: 2016 to 2035
- Projections from the U.S. Energy Information Administration (EIA) Annual Energy Outlook adapted to Indiana
- Baseline (status quo) + 3 scenarios:
 - Indexing fuel taxes (gasoline and special fuels) to inflation
 - Indexing fuel taxes to inflation and fuel economy
 - Using a vehicle miles traveled (VMT) fee
- Other revenue sources:
 - Major Moves Draw, Motor Carrier Fuel Use Tax (MCFUT), vehicle permits, Motor Carrier Surtax, International Registration Plan (IRP), and states sales tax.



General Overview



Local Distribution

- Local Distribution
 - 31.9% to Cities and Towns
 - 68.1% to Counties
- Cities and Towns
 - Population based
- Counties
 - 5% equally to all counties
 - 30% based on vehicle registration
 - 65% based on county mileage

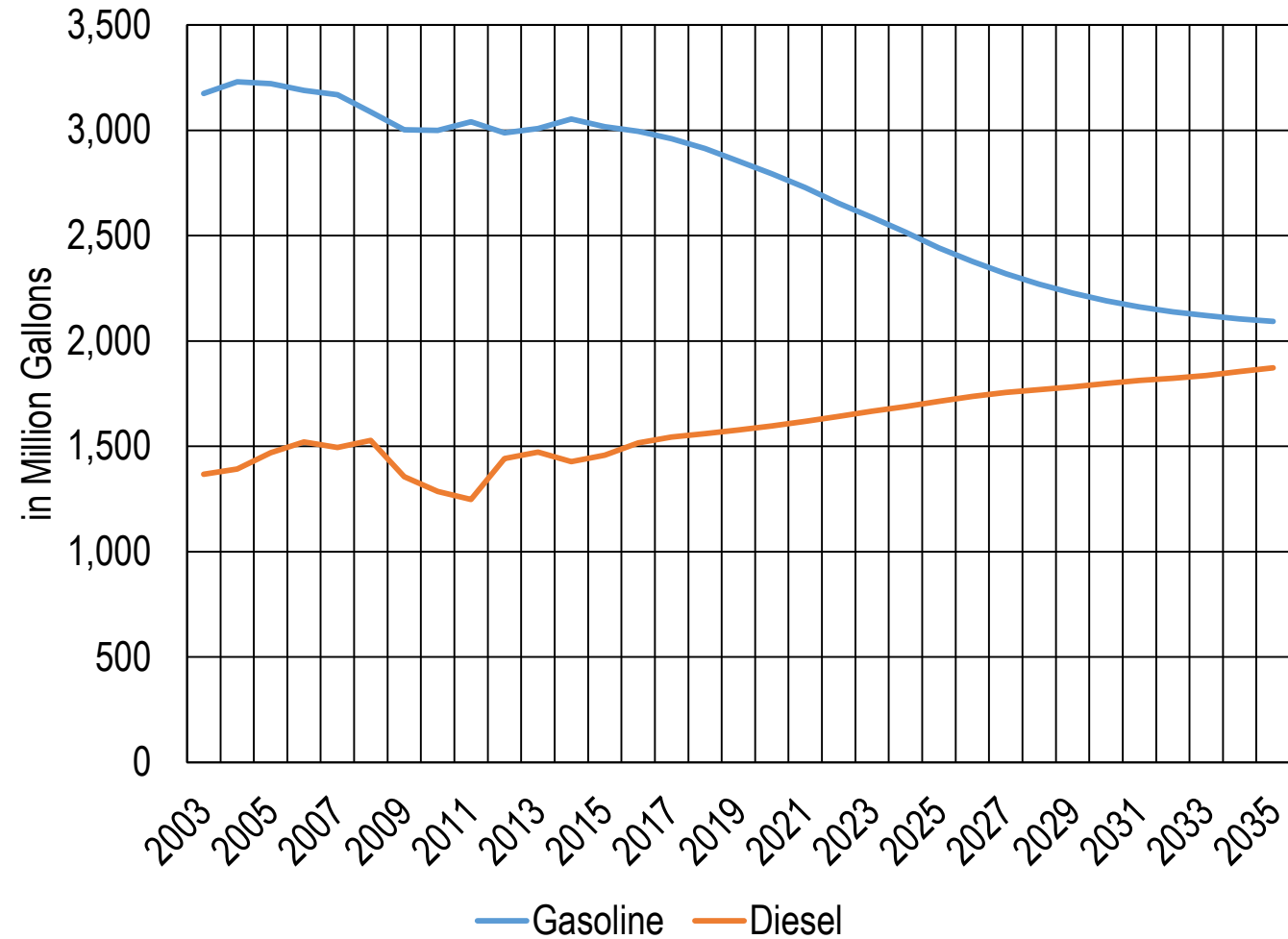


Results Overview

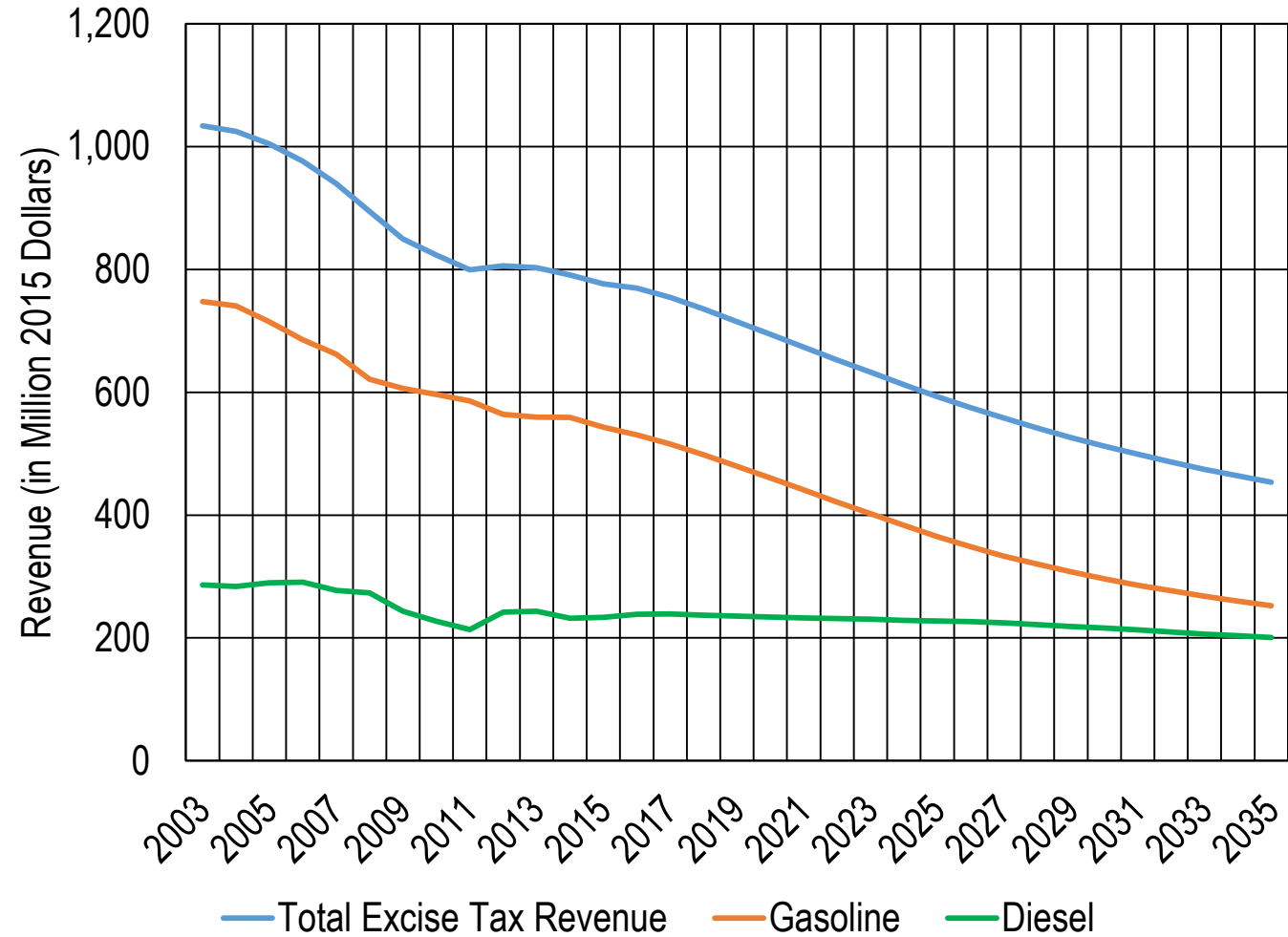
Summary Forecast	2016	2035				2035 (Total Change)			
		Base-line	CPI	CPI-MPG	VMT	Base-line	CPI	CPI-MPG	VMT
Consumption (in Million Gallons)									
Gasoline	2,995	2,094	2,081	2,064	2,055	-30.1%	-30.5%	-31.1%	-31.4%
Diesel	1,517	1,872	1,871	1,869	1,873	23.5%	23.4%	23.2%	23.5%
Excise Tax Revenue	769	454	674	1,001	945	-41.0%	-12.4%	30.1%	22.9%
SHF INDOT	592	416	534	709		-29.7%	-9.8%	19.8%	
Counties	270	191	245	324		-29.1%	-9.3%	20.2%	
Counties (Car Registration)	92	60	85	122		-34.4%	-7.3%	32.9%	
Cities and Towns	124	87	112	149		-29.8%	-9.9%	19.8%	



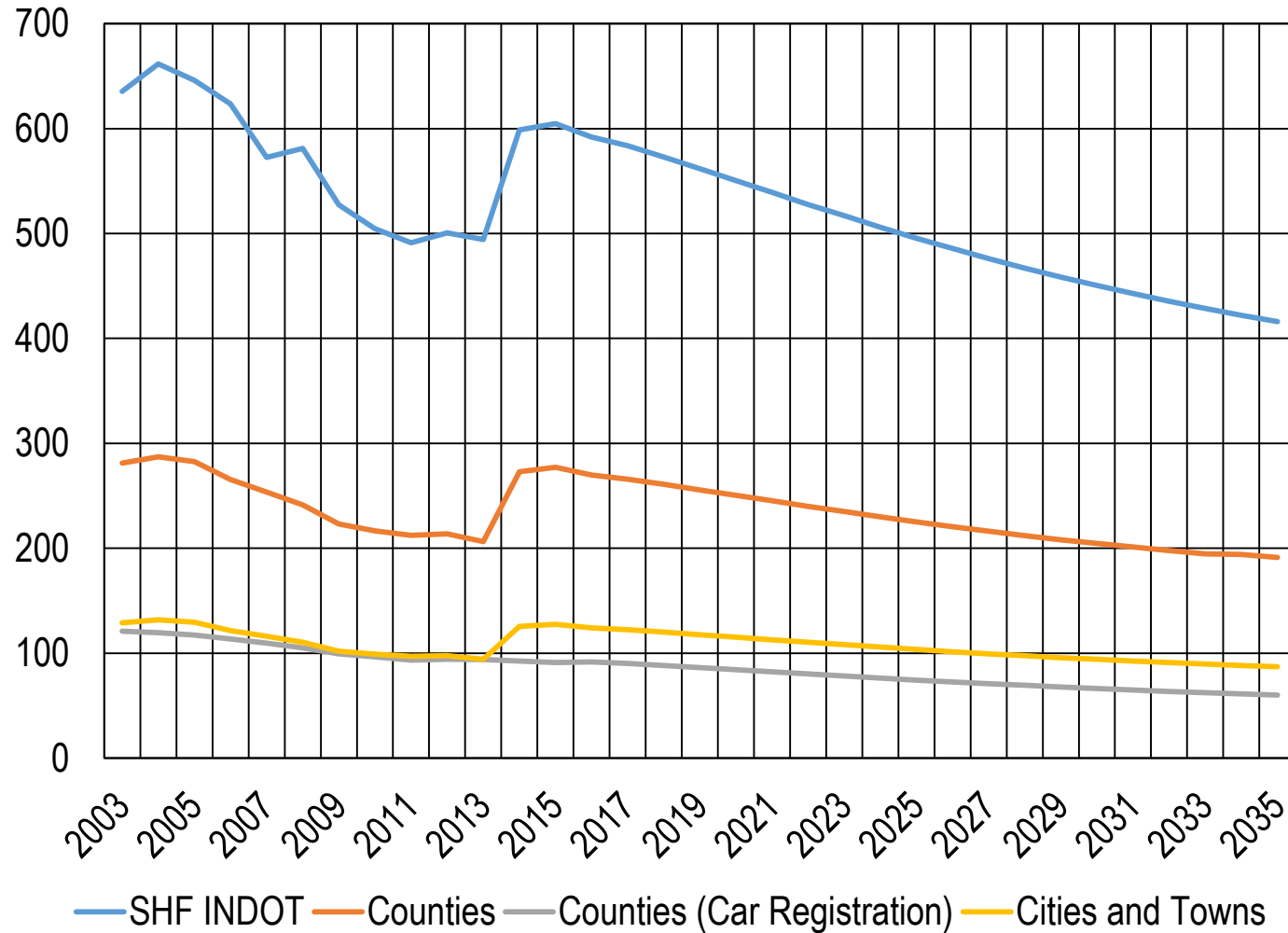
Consumption of gasoline and diesel



Baseline Excise Tax Revenue



Distribution of the MVHA



Cost per Mile

Cost per Mile	2016	2035				2035 (Total Change)			
		Base	CPI	CPI- MPG	VMT	Base	CPI	CPI- MPG	VMT
Gasoline Car	0.126	0.098	0.100	0.103	0.092	-22.3%	-20.5%	-18.0%	-26.8%
Gasoline Truck	0.171	0.133	0.136	0.141	0.125	-22.3%	-20.5%	-18.0%	-26.8%
Diesel Truck (Light Duty)	0.139	0.143	0.143	0.144	0.138	3.1%	3.5%	4.1%	-0.7%
Diesel Truck (Freight Heavy Duty)	0.268	0.296	0.298	0.299	0.292	10.5%	10.9%	11.5%	8.8%



Local Option Highway User Tax

- Introduction of the Local Option Highway User Tax in 1980:
 - **Vehicle excise surtax:**
 - Paid at the time of registration and applied to cars, motorcycles and trucks under 11,000 pounds.
 - **Wheel tax:**
 - Applied to all vehicles not subject to the surtax, e.g., buses, RVs, trailers, trucks, tractors.
 - Ranges between \$5 and \$40 per vehicle and may differ within each vehicle category based on weight.
 - Public or certain non-profits are excluded.
- Revenue generated in 2010: \$69 million



Calculations for 2017

- Some revenue collected goes to cities and towns as well besides the county
- Estimated maximum county portion of LOHUT **without** an asset management plan: \$108.3 million
- Estimated maximum county portion of LOHUT **with** an asset management plan: \$217.2 million
- Average annual statewide growth rate of 0.26%
 - LOHUT growth approximated by population
- Minimum and maximum growth: -0.96% and 1.82%



Conclusion

- Increase in fuel economy is outpacing VMT
 - Consequence: Indexing fuel taxes to inflation only partially compensates for the decrease.
 - Indexing fuel taxes to inflation and fuel economy results in fuel taxes driven by the increase in VMT (which is driven by an increase in population).
- Cost per mile for drivers is decreasing due to an increase in fuel economy.



Local Options - Funding

- Utilize debt to fund additional projects in short-term
 - Commercial lending
 - Bonding
 - State Infrastructure Bank (would have to be expanded)
 - Indiana Bond Bank – Pool Program and Community Funding Resource



Local Options - Funding

- Cost sharing
- Enable local transportation improvement districts
 - Based on Economic Improvement Districts (IC 36-7-22)
 - Self-help option
 - Ensure a targeted investment in a particular location



Local Options- Increased Efficiency/Effectiveness

- Make method for local transportation decisionmaking overt
 - Asset management
 - Capital improvements planning
- Need good regular information about assets, conditions, traffic, trip patterns, etc.



Asset Management

- HB1001 requirement for the Grant program
- Good requirement
- Determining what you have and how you are going to take care of it.
- Multi-year plan that optimizes funding and network condition
- Abandon a worst first approach
- Adopt a systemic approach to the network
- Create a mix of fixes
- Use the right treatment on the right road at the right time



Asset Management Plans

- Pavement Plan
- Bridge Plan



Data Management System

- **Developing design document**
- **GIS and web based**
- **Allow LTAP to archive and analyze data**
 - Annual report data
 - Pavement condition
 - Establish pavement and bridge deterioration curves
 - Treatment costs
 - Maintenance costs
 - Winter operation costs
 - More accurate unit costs for future need calculations



Capital Improvements Plan

- Short-range plan (three to ten years) that selects and sequences local government capital projects and equipment purchases.
- Review capital needs and recommendations in various local plans (asset inventory, land use, economic development, redevelopment, etc.)
- Solicit need from other agencies with justification
- Develop costs
- Evaluate project against available funding.
- Select projects for each year of the plan



Local Options- Increased Efficiency/Effectiveness

- Local investment/disinvestment strategies
 - Doesn't have to be worst first, ought to be more strategic
 - Fix it first strategy
 - Selective reduction of bridge inventory
 - Return paved roads to gravel
 - Set local farm-to-market truck routes or farm-to-farm routes as a priority
 - Aligning land use and transportation decisionmaking



Local Options- Increased Efficiency/Effectiveness

- Collaborate with other local governments on the purchase of road and bridge construction, maintenance, and materials
 - Outsourcing
 - Joint purchasing



Some Thoughts

- Clear need for a way to get resources to counties, in part, using some other method than current distribution formulas that reward for population and vehicles.
- Recommendations for standardizing highway report data
 - LTAP working with counties to make them electronic
 - Need better definitions and review of data
- With the strong inducement for asset management plans, add'l analyses possible



Next Steps

- Long-term state-level funding solutions
- Local funding solutions
- “Other” local responses when funding isn’t enough

