



**MID-STATES  
CORRIDOR**

# **APPENDIX B: ECONOMIC PERFORMANCE MEASURES & METHODS**

## **Mid-States Corridor Tier 1 Environmental Impact Study**

Prepared for  
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Mid-States Regional Development Authority

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# 1. INTRODUCTION

In this appendix we define and evaluate the economic development performance measures and methodologies. Key to the evaluation of alternatives is the development of objective performance measures. These performance measures serve as “yardsticks” for assessing the degree to which an alternative achieves an intended goal. They also permit an objective method for comparing the relative performance of alternatives.

Performance measures for the Mid-States Tier 1 EIS are documented in **Chapter 1 – Purpose and Need** and **Appendix CC – Purpose and Need Appendix**. This appendix describes and provides detailed breakdowns on the performance measure calculations for the project’s economic development goals listed below. The performance measures for these goals are summarized below and are discussed in detail in **Section 3**.

The Purpose and Need’s economic development goals are as follows:

- **Goal 5 – Increase Levels of Business Activity within Southern Indiana.**
- **Goal 6 – Increase Personal Economic Well-Being in Southern Indiana.**

The following measures were evaluated:

- a. Increase in regional gross domestic product within 12-county Study Area (measured in total dollar-years 2038 to 2057) – Goal 5
- b. Increase in total employment within 12-county Study Area (measured in total job-years 2038 to 2057) – Goal 5
- c. Increase in employment in high-wage jobs in 12-county Study Area (measured in total job-years, 2038 to 2057) – Goal 5
- d. Increase in employment in high-growth jobs in 12-county Study Area (measured in total job-years, 2038 to 2057) – Goal 5
- e. Increase in personal income within 12-county Study Area (total dollar-years, 2038 to 2057) – Goal 6

# 2. TREDIS

## Introduction

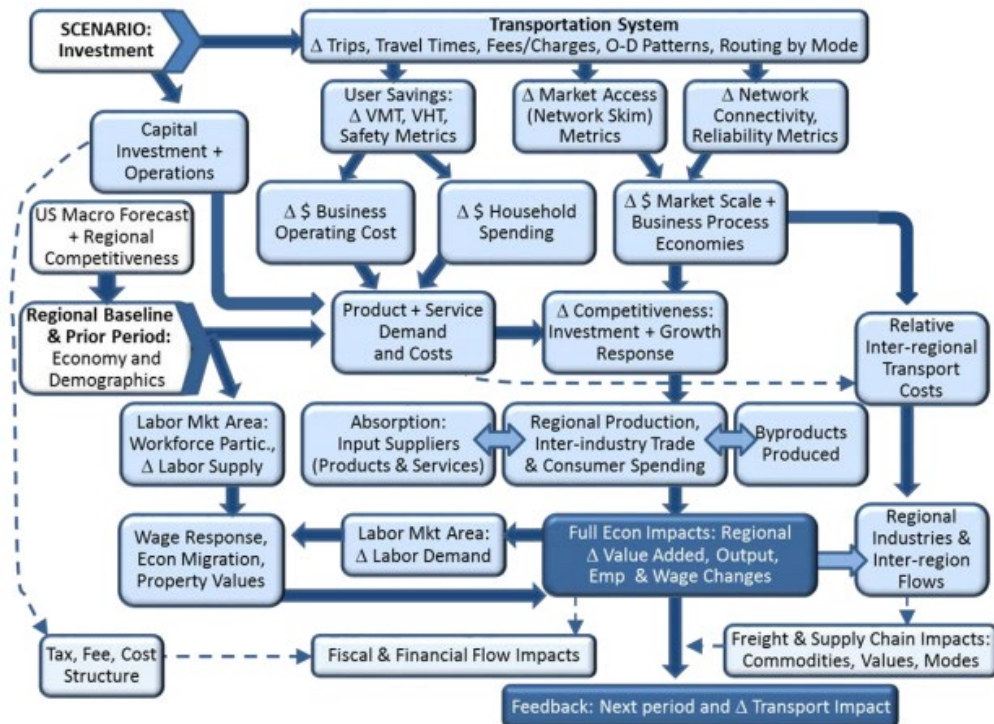
The economic development performance measures are provided by TREDIS - Transportation Economic Development Impact System. TREDIS is designed to enable evaluation (appraisal) of proposed transportation investment projects, policies and programs.

TREDIS calculates the economic impacts, benefits and costs of proposed projects, programs and policies. It is a comprehensive decision support system that spans economic impact analysis, benefit-cost analysis and financial analysis, as well as freight and trade impact analysis. It is used throughout the United States, Canada, and Australia. For the Mid-States project, INDOT used a TREDIS license, which Purdue University has purchased for INDOT’s use. This license allows INDOT to use TREDIS for projects



throughout Indiana. It is INDOT’s standard tool for evaluating the economic impacts of transportation projects. The processes within the TREDIS model are portrayed in **Figure 1**.

We used TREDIS to evaluate the economic performance measures of the different alternatives. The economic impact analysis module of TREDIS is used to capture the performance measures. Economic Impact Analysis in TREDIS calculates the impact of a project, plan or policy on the economy, and shows incidence and distribution of effects across space (areas), over time, and among elements of the economy (households and industries).



**FIGURE 1: TREDIS MODEL STRUCTURE FORECASTS OF STUDY AREA ECONOMIC IMPACT**

## TREDIS incorporation into the travel forecasting process

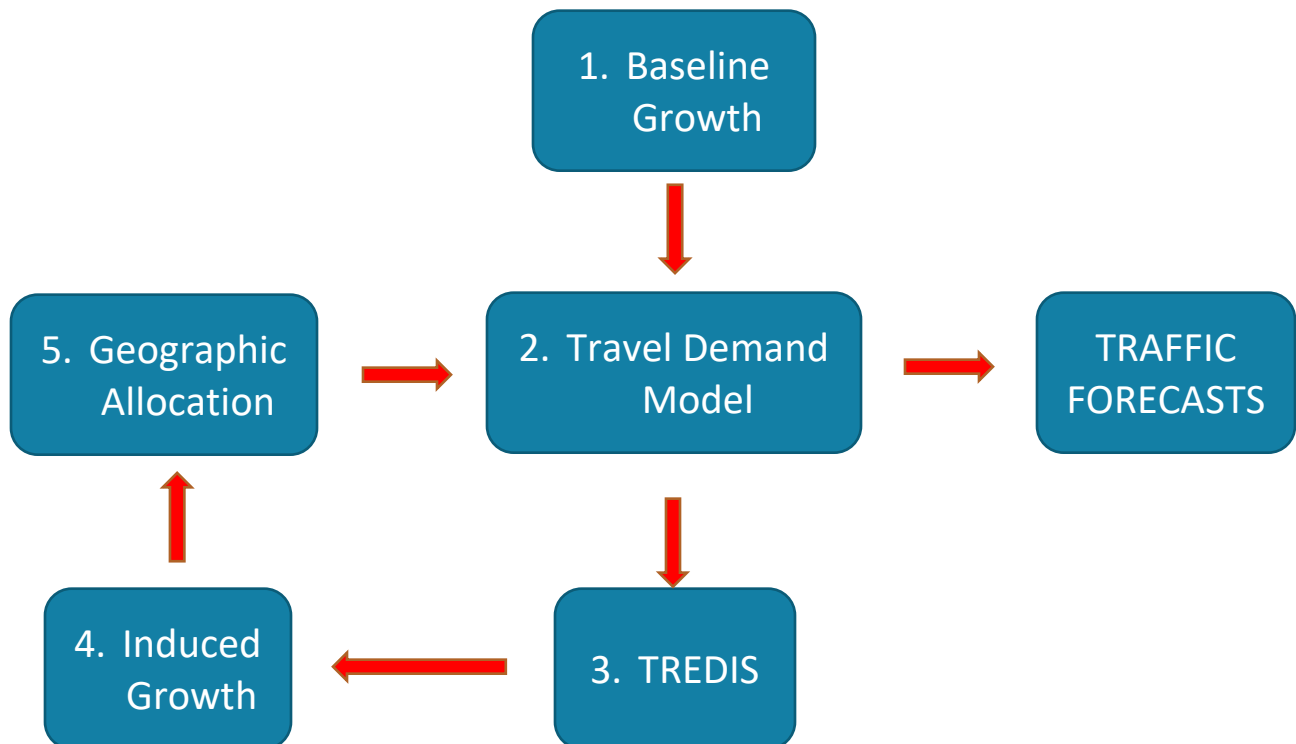
The Mid-States Corridor project evaluates economic impacts by considering both baseline and induced economic growth. Baseline growth is that anticipated to occur regardless of the Mid-States Corridor project. It is forecasted by TREDIS as the baseline for all analyses. Induced growth is additional growth that will occur because of the Mid-States Corridor project, and it is the focus of the TREDIS analyses.

The analysis framework is illustrated in **Figure 2**.

1. Baseline growth forecasts were prepared for the 2045 project design year. Population and employment obtained on a county-level basis from Indiana Statewide Model. These county-level forecasts were allocated to Traffic Analysis Zones (TAZs) within each county based upon existing trends and land available for development. These forecasts served as inputs to the Travel Demand Model in Step 2.



2. Mid-States Corridor Travel Demand Model was run for the 2045 design year. Both Build and No-Build scenarios were run. Both cost savings and increases in accessibility were calculated based on differences between the Build and No-Build scenarios.
3. TREDIS was run for the 2045 design year. Inputs to the TREDIS analysis included the direct benefit measures (cost savings and increases in accessibility) determined by the Travel Demand Model in Step 2.
4. TREDIS determined how these benefits resulted in increases in business activity and employment. TREDIS then forecasted resulting increases in employment, population, household income and economic output. These measures represent induced growth due to Mid-States Corridor and serve as purpose and need performance indicators.
5. The induced growth forecasted by TREDIS, and the baseline growth were then reviewed by an internal team which had a rich background and experience in the socioeconomic landscape of the Study Area. The team reviewed the geographic allocation of the population and employment growth based on their knowledge of zoning, available land and the development potential of the communities they represent.
6. The baseline and induced growth were reallocated geographically to TAZs based on the input from the internal team. The final travel demand model run reflected all induced and reallocated growth. This enabled the traffic forecasts to incorporate all anticipated growth in the consensus locations.



**FIGURE 2: MID-STATES CORRIDOR MODELING PROCESS**



## TREDIS Inputs

TREDIS requires several inputs of both general project characteristics as well as outputs from the travel demand model. The general project information was assumed to be consistent between all the alternatives evaluated. They included the following.

- **Construction Start Year:** 2025
- **Construction End Year:** 2037
- **Operation Start Year:** 2037
- **Operation End Year:** 2050
- **Constant Dollar Year:** 2020
- **Modes of Travel:** Passenger Cars, Tractor Trailer Trucks, Light/Medium Duty Trucks
- **Study Region Counties:** Spencer, Dubois, Perry, Warrick, Pike, Daviess, Crawford, Orange, Martin, Lawrence, Greene and Monroe Counties
- **Project Cost:** \$344 - \$1,313 Million

Outputs from the travel model were included to compare the No-Build scenario with each build alternative. These outputs from the No-Build and build alternatives include:

- Total number of annual vehicular trips
- Annual vehicle miles of travel (VMT)
- Annual vehicle hours of travel (VHT)
- Fraction of miles that are congested (a level of service E or F was considered congested for this analysis)
- Fraction of trips that are internal, incoming, outgoing and passing through the Study Area
- Fatal, personal injury and property damage/other crashes per 100 million VMT
- Population within a 40-minute drive time of the Study Area (including the population within the Study Area) – The default TREDIS value was used for this input.
- Employment within a 180-minute drive time of the Study Area (including the employment within the Study Area) – The default TREDIS value was used for this input.
- Average time from within the Study Area to an international border crossing (the Ambassador Bridge in Detroit, MI was determined to be the closest border crossing)
- Average drive time from within the Study Area to a freight rail terminal (CSX – Indianapolis Avon Yard were determined to be a qualifying freight terminal in the Study Area)
- Average drive time from within the Study Area to a passenger rail terminal (the Indianapolis Amtrak station was the only qualifying passenger rail terminal in the Study Area)
- Average drive time from within the Study Area to a domestic airport (the Indianapolis Airport was the only qualifying domestic airport in the Study Area)
- Average drive time from within the Study Area to an international airport (O'Hare International Airport in Chicago was the closest qualifying international airport to the Study Area as determined by the list of qualifying international airports provided by EDR)
- Average drive time from within the Study Area to an intermodal port facility (the Port of Louisville, KY was determined to be the closest qualifying port facility to the Study Area)
- The economic development measures are aggregated from 2038 (when the benefits start accruing) until 2057 to provide a 20-year benefit estimation. Since TREDIS predicts the measures only up to 2050, we assume the benefits continue to accrue on a flatline basis from 2050 until 2057.



## **3. ECONOMIC DEVELOPMENT PERFORMANCE MEASURES**

The Purpose and Need identified the following economic development performance measures. All benefit calculations are by way of comparison to the baseline case. For example, increase in the number of jobs due to a particular alternative will be the number of jobs under that TREDIS scenario compared to the jobs in the baseline scenario.

- 1. Increase in regional gross domestic product within 12-county Study Area (measured in total dollar-years 2038 to 2057)** – Due to improved and increased access to employment and industrial locations, the alternatives will facilitate improvement in the economy of the region. Businesses will have more efficient supply chain processes; more employees will be able to access multiple employment locations and it will result in a virtuous cycle of economic growth.

The increase in the gross domestic product of the region is measured to estimate the economic benefits accrued due to the alternative. The increase in gross domestic product is defined as the sum of all the incremental output by different industries. These industries include:

- Agriculture & Extraction
- Utilities
- Construction
- Manufacturing
- Wholesale Trade
- Retail Trade
- Transportation
- Postal & Warehousing
- Media & Information
- Financial Activities
- Professional & Business
- Education & Health
- Other Services
- Government

The incremental output from all these industries is aggregated across the analysis period starting from 2038 to 2057. The aggregated incremental output is the increase in regional domestic product.

- 2. Increase in total employment within 12-county Study Area (measured in total job-years 2038 to 2057)**

The increase in employment is the increase in total jobs across the different industries and job types. Below is the breakdown of job types included within the total increase.

- Management Occupations
- Business and Financial Operations Occupations
- Computer and Mathematical Occupations
- Architecture and Engineering Occupations
- Life, Physical, and Social Science Occupations
- Community and Social Service Occupations



- g. Legal Occupations
- h. Education, Training, and Library Occupations
- i. Arts, Design, Entertainment, Sports, and Media Occupations
- j. Healthcare Practitioners and Technical Occupations
- k. Healthcare Support Occupations
- l. Protective Service Occupations
- m. Food Preparation and Serving Related Occupations
- n. Building and Grounds Cleaning and Maintenance Occupations
- o. Personal Care and Service Occupations
- p. Sales and Related Occupations
- q. Office and Administrative Support Occupations
- r. Farming, Fishing, and Forestry Occupations
- s. Construction and Extraction Occupations
- t. Installation, Maintenance, and Repair Occupations
- u. Production Occupations
- v. Transportation and Material Moving Occupations
- w. Military Specific Occupations

**3. Increase in employment in high-wage jobs in 12-county Study Area (measured in total job-years, 2038 to 2057)**

TREDIS has categorized jobs into Low, Middle, and High wage groups and into Not Growing, Growing and Stable, Growing and Unstable & Not Growing groups. For example, for the 12-County Study Area, agriculture related employment (e.g., agricultural and food scientists, agricultural engineers) is categorized as Middle or High Wage and Growing. Job categories are designated as “Growing” if the number of jobs grows at least 0.5 percent annually.

In this measure we provide the total increase in employment in the high-wage category of jobs measured in job-years during the analysis period. The increase in high-wage jobs is in comparison to high-wage jobs in baseline scenario. Examples of high-wage category as specified in TREDIS are Chief Executives, General and Operations Managers, Human Resources Workers and Civil Engineers.

**4. Increase in employment in high-growth jobs in 12-county Study Area (measured in total job-years, 2038 to 2057)**

In this measure we provide the total increase in employment in the high-growth category of jobs measured in job-years during the analysis period. Examples of high-growth category as specified in TREDIS are Marketing and Sales Managers, Management Analysts and Meeting Convention and Event Planners, among others.

**5. Increase in personal income within 12-county Study Area (total dollar-years, 2038 to 2057)**

Personal income increase is calculated by aggregating all the labor income accrued during the analysis period.





**Table 1** summarizes the various economic impacts the different alternatives have in the 12-county Study Area. The benefits shown are cumulated over from 2038 to 2057 and hence presented in terms of million dollar-years or job-years. As seen from the table results, Alternatives C (expressway variation), P and M have positive economic impacts on the Study Area. Route P and M result in growth in the total employment and personal income in the 12-county Study Area.

Mid-States Corridor Economic Performance Measures					
Alternative	Increase in regional GDP*	Increase in total employment**	Increase in employment in high-wage jobs**	Increase in employment in high-growth jobs**	Increase in personal income*
B2	\$9	282	73	102	\$16
B3	(\$25)	248	56	30	\$10
C2	\$112	863	182	274	\$46
C3	(\$14)	259	44	(7)	\$12
M2	\$259	1,535	353	652	\$83
M3	\$218	1,269	300	533	\$71
O2	\$25	429	98	114	\$21
O3	(\$32)	228	26	(79)	\$9
P2	\$451	2,453	547	1,024	\$136
P3	\$314	1,710	397	731	\$96

\* Measured in the 12-county Study Area in total million dollar-years 2038 to 2057

\*\* Measured in the 12-county Study Area in total job-years 2038 to 2057

**TABLE 1: MID-STATES CORRIDOR ECONOMIC PERFORMANCE MEASURES SUMMARY**