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# Economic Impact of Interstate Bridge Replacement Program Capital Investment

## Report

March 2023

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Prepared for:



Prepared by:



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## ACRONYMS AND ABBREVIATIONS

BEA	Bureau of Economic Analysis
EIA	Economic Impact Analysis
FY	(State) Fiscal Year
IBR	Interstate Bridge Replacement
LPA	Locally Preferred Alternative
ODOT	Oregon Department of Transportation
RIMS	Regional Input-Output Modeling System
WSDOT	Washington State Department of Transportation
YOE	Year of Expenditure

## 1. INTRODUCTION

An initial economic impact analysis (EIA) approach was developed in 2021 to measure the positive capital construction spending impacts of the Interstate Bridge Replacement (IBR) program. The application of the approach and presentation of impact results then awaited the completion of an IBR-specific cost estimate, which became available in early December 2022. Using multipliers from the U.S. Bureau of Economic Analysis’s Regional Input-Output Modeling System (BEA RIMS II) tool, the EIA approach assessed and quantified the ripple effects within the regional economy of IBR program capital spending. The economic impacts are measured in terms of employment (person-year jobs), job earnings, and the overall value of economic activity (output).

This study presents the gross economic impacts from construction based on total anticipated project expenditures, as well as the net impacts, which are based on the portion of the project funding originating from sources outside the states of Oregon and Washington (e.g., federal funding uniquely tied to the IBR program). The net impacts account for the fact that in the absence of the project, the same state and local funding sources would likely be spent in other ways within Oregon and Washington that could generate similar multiplied levels of economic activity. Lastly, the study accounts for the fact that not all of the economic impacts would remain local, with some of the expenditures flowing out of the regional economy.

The economic study area of the analysis is the greater Portland, Oregon–Vancouver, Washington metropolitan region. The analysis methods, results, and findings are summarized following this introduction.

### 1.1 Analysis Methodology

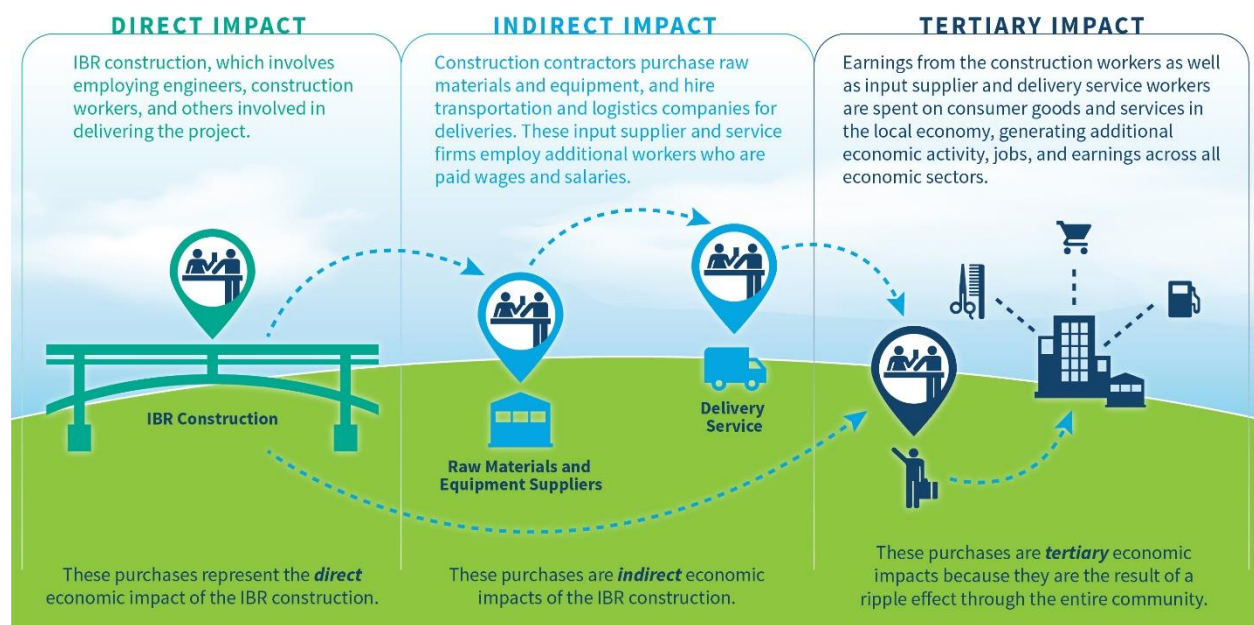
Economic impact analysis can be simply defined as the study of the effect of a change in the demand for goods and services on the level of economic activity in a given area. Traditionally, EIA involves the estimation of three types of effects: direct, indirect, and tertiary (induced). The total economic impact is the sum of these direct, indirect, and tertiary effects for the activity or project being evaluated:

- **Direct effects** – Refers to the economic activity occurring as a result of direct spending by businesses or agencies locally engaged in delivering the program (e.g., construction spending results in employment for construction workers, engineers, and designers who are specifically hired to work on IBR).
- **Indirect effects** – Refers to the economic activity resulting from purchases by local firms who are the suppliers to the directly affected businesses or agencies (e.g., the IBR program generates demand for steel as an intermediate good).
- **Tertiary effects** – Represents the increase in economic activity in all economic sectors over and above the direct and indirect effects that are associated with increased labor income that accrues to workers (of directly and indirectly affected businesses), inducing increased expenditures on household consumption of goods and services purchased from businesses within the bi-state region (e.g., local workers spending their job earnings at restaurants and stores).

The flow of impacts is depicted in Figure 1. The indirect and tertiary effects are often referred to as multiplier effects, since they typically lead to a total economic impact that is substantially larger than the direct effect alone. In theory, the larger the economic region, the larger the multiplier value, and thus, the larger the overall response (total gross economic impact) to the initial shock (direct expenditures). In reality, while indirect and tertiary impacts always occur, the magnitude of their influence on the total level of economic activity in an area can vary by the type of expenditures, the size of the area defining the local economy, and the ability of the local economy to attract the additional workers and capital resources needed from elsewhere.

The RIMS II multipliers for the Portland-Vancouver region take into account that not all transportation project materials and labor can be procured locally; however, additional IBR program-specific adjustments have been made to account for a portion of expenditures that may immediately flow outside the local economy and thus not contribute to local economic activity.

Figure 1. EIA Impacts



### 1.1.1 Impact Metrics

For this IBR program analysis, the changes in demand for goods and services due to direct project expenditures are measured by changes in employment, labor income, and total output.

Employment impacts measure the number of jobs created for a full year by annual expenditures. Although the majority of construction and related jobs are full-time, the employment counts should not be strictly interpreted as full-time equivalent, as they reflect the mix of full and part-time jobs that is typical for each sector. Additionally, the employment outputs should not be interpreted as permanent jobs either, but rather as person-year jobs created or sustained: one person-year job equals one person working a job for a one-year duration or two persons with jobs held for half a year.

Labor income represents the total value of employee compensation (wage and salary payments plus benefits and any other non-cash compensation) supported by the project, as well as proprietor income (e.g., income of self-employed individuals such as lawyers). Together with the value of intermediate inputs (the goods and services purchased from other firms or industries), taxes on production and imports (e.g., excise taxes), and other property type income (e.g., rents), labor income is part of total output. Total output (economic activity) is the value of goods and services produced as a result of the project's expenditures and their multiplier impacts (e.g., sales of goods and services, other operating income, and change in inventory). Direct output for the construction period equals the project's expenditures as the sum of the hard and soft costs.

### 1.1.2 Assumptions

To measure the contribution of the IBR program to the regional economy, RIMS II multipliers for the Portland-Vancouver metropolitan area were used. General inputs of the analysis include the following cost and schedule estimates:

- The preliminary engineering/professional services, right-of-way, and capital construction cost estimates reflect the 2022 IBR Modified Locally Preferred Alternative (LPA) Scenario D scope of work and are provided as risk-loaded estimates for the "Post-Risk Mitigation" outcome.<sup>1,2</sup>
- The project duration extends from fiscal year (FY) 2020 through FY 2034, following the aging of the December 2022 IBR cost estimate.
- Escalation of costs to year of expenditure (YOE) dollars uses WSDOT's third-party-provided inflation projections for preliminary engineering, right-of-way, and construction cost indices (Q1 2022 update) as published by the Office of Capital Program Development and Management.

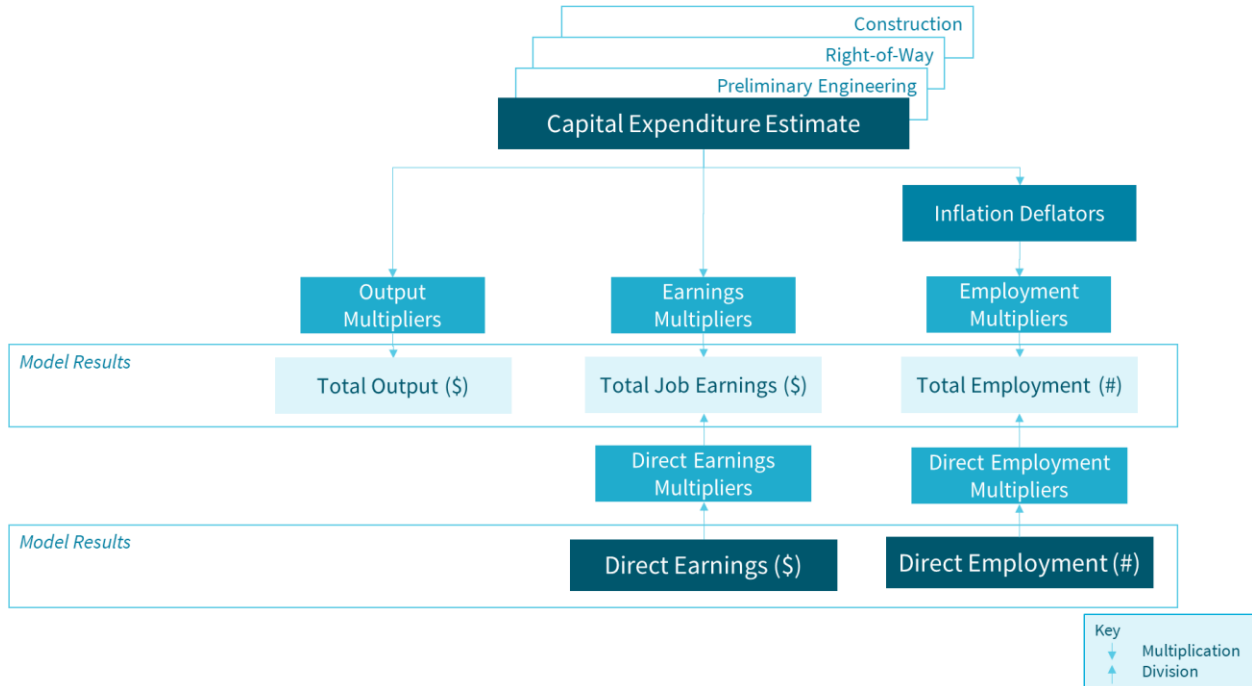
The process by which capital expenditures generate economic impacts is depicted in Figure 2.

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<sup>1</sup> The real estate expenditure multipliers account for and capture limitations associated with right-of-way acquisition that the costs represent asset transfers and do not necessarily generate economic production. However, the land sellers are likely to repurchase in the region and may buy a lower-cost property and invest the difference in remodeling, etc., which may generate real estate commissions, title company, attorney, and appraiser work.

<sup>2</sup> An IBR-specific cost estimate was developed in late 2022 and evaluated using WSDOT's Cost Estimation Validation Process to quantify and incorporate various delivery risks, their costs, and probabilities into risk-loaded cost estimates. The 60th percentile risk-loaded estimates were released in December 2022. The cost estimate used throughout this EIA is \$5.935 billion.

Figure 2. EIA Multiplier Process (RIMS II Multipliers)



Other key input assumptions include the following:

- While the majority of goods and services would be procured from local suppliers, additional adjustments beyond those captured within the RIMS II multipliers were made to account for those expenditures that are expected to immediately exit the bi-state regional economy:<sup>3</sup>
  - 75 percent of preliminary engineering/professional services would be initially procured within the bi-state region.
  - 100 percent of right-of-way acquisition would be procured within the bi-state region.
  - 75 percent of capital construction cost expenditures would be made for goods and services initially procured within the bi-state region.

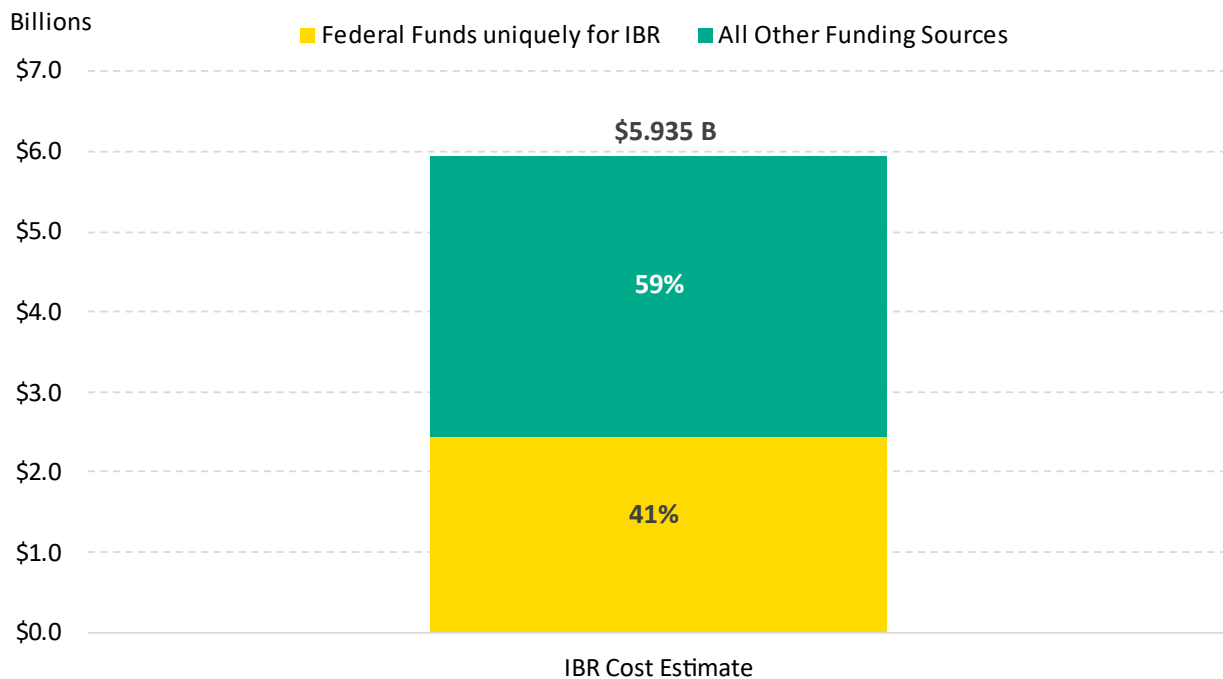
<sup>3</sup> IBR program team assumptions account for a portion of preliminary engineering consultant services, as well as construction materials and equipment being procured directly from sources outside of the bi-state region.



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- The level of direct expenditures for the IBR program was based on the IBR Modified LPA Scenario D Post-Risk Mitigation cost estimate (December 2022 IBR cost estimate), with the assumption that approximately 41.3 percent of those estimated expenditures would be paid from federal (non-local) funding sources uniquely tied to the IBR program, as depicted in Figure 3.<sup>4</sup>
- The cost estimate is presented in YOE dollars based upon a program development schedule from FY 2020 through FY 2034, and it represents the direct impacts that trigger the multiplied economic impacts.
- Job impact multipliers are discounted by expected inflation to FY 2020 values to account for wage and salary escalation that reduces the number of jobs created per unit of expenditure over time (e.g., \$1 million of expenditures will generate fewer jobs in 2030 than it does in 2021 due to inflation in salaries and wages). FY 2020 is used as the baseline because the RIMS II multipliers reflect data from 2019/FY 2020.

Figure 3. EIA Project Cost and Funding Assumptions (Billions of YOE Dollars)



<sup>4</sup> IBR program team assumptions for federal discretionary grant funding are based on the 2021 federal Bipartisan Infrastructure Bill (BIL) that includes two new major grant programs: the FHWA Competitive Bridge Investment Program (BIP) and the USDOT National Infrastructure Project Assistance Program (Mega Program). In addition to funding from both of these new programs, the IBR program assumes receipt of an FTA Capital Investment Grant (CIG) to support the program’s transit component. These are current estimates as of publishing and will continue to be refined as funding is secured or more information is available.

## 2. ANALYSIS RESULTS

The IBR program is expected to deliver substantial positive economic impacts to the Portland-Vancouver metropolitan region measured in increased jobs, employment earnings, and the dollar value of regional product. The minimum net impacts are based on the portion of the direct project expenditures attributed to funding originating outside the two states (e.g., federal discretionary funding uniquely tied to this project). Actual economic impacts would likely fall somewhere between the minimum net and total gross impacts, as spending generated from infrastructure construction tends to stay within the local economy longer, potentially generating greater economic multiplier effects than other personal consumption uses. The 2022 IBR cost estimate assumes a federal (non-local/state) funding share of 41.3 percent.

The minimum net and gross impacts for the IBR program are reported in Table 1 and Table 2. Throughout the 15-year construction period, the \$5.935 billion investment is estimated to support in terms of minimum net impacts at least 13,460 direct, indirect, and tertiary (induced) person-year jobs, \$1.0 billion in labor income, and \$3.6 billion in total economic output. When accounting for all funding sources, the total direct project expenditures are included in the EIA as the measures of total gross impacts. The \$5.935 billion investment is expected to support 43,300 total person-year jobs, \$3.3 billion in labor income, and \$11.6 billion in output.

Table 1. IBR Minimum Net and Gross Economic Impacts: Employment

Economic Impacts	Direct Project Expenditures (project cost in YOE)	Direct Project Construction Employment (person-year jobs)	Total Employment Across all Industries (person-year jobs)
Minimum Net	\$5,935 M	5,870	13,460
Gross	\$5,935 M	18,700	43,300

Table 2. IBR Minimum Net and Gross Economic Impacts: Earnings and Output (YOE in Millions of Dollars)

Economic Impacts	Direct Project Expenditures (project cost in YOE)	Direct Employment Earnings	Total Employment Earnings across all Industries	Total Impacts on Economic Activity across all Industries
Minimum Net	\$5,935 M	\$520 M	\$1,020 M	\$3,630 M
Gross	\$5,935 M	\$1,680 M	\$3,300 M	\$11,580 M

A graphical representation of the job impacts for the IBR program is provided in Figure 4. The chart values show direct IBR program jobs of 18,700, total gross person-year jobs over the construction

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period of 43,300, with the minimum net person-year jobs supported totaling 13,460. The total gross job estimates are the sum of annual gross employment impacts and are projected to peak in FY 2030 with nearly 2,500 to 8,050 jobs across all industries, including direct IBR program construction employment of 1,050 to 3,450 persons.

Figure 4. Total Employment (Person-Year Jobs)

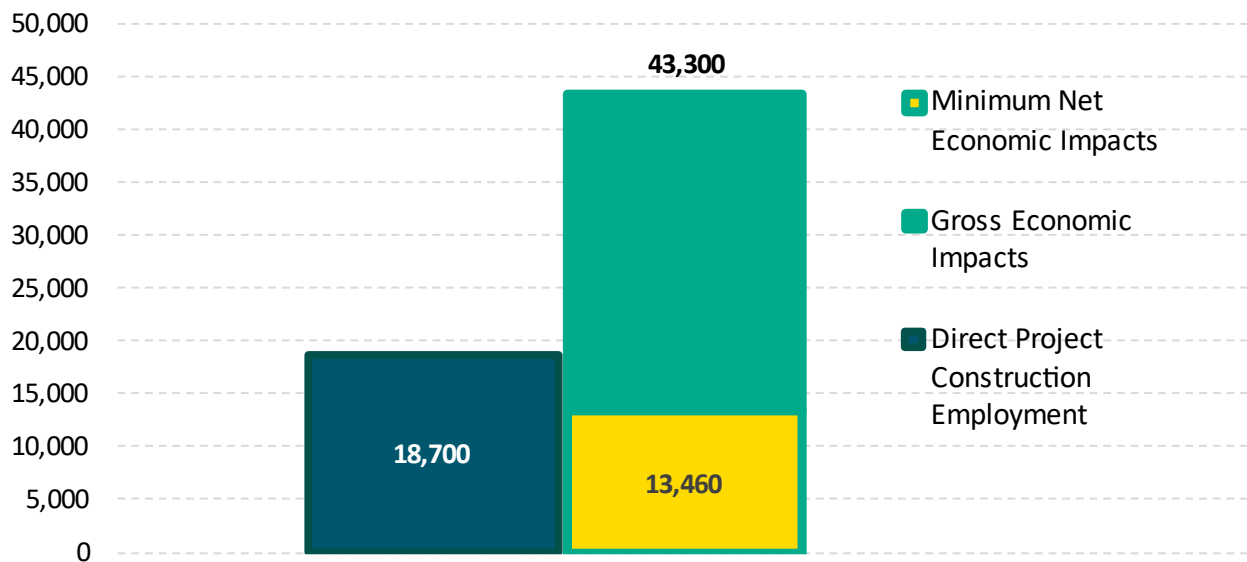
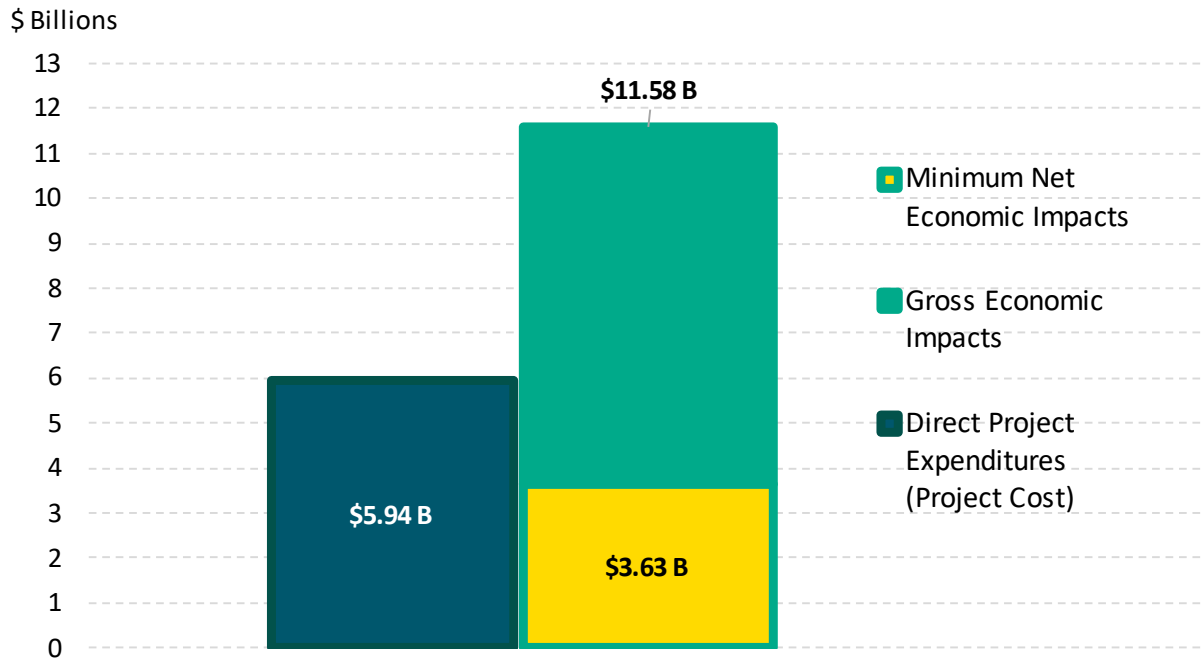


Figure 5 depicts the expenditure and outputs. With the direct IBR program construction expenditure of \$5.935 billion, total gross final economic output would amount to \$11.6 billion. The minimum net final economic output resulting from project funding originating outside the two states is estimated to be \$3.6 billion.

Figure 5. Total Economic Activity (Billions of Dollars)



### 3. FINDINGS

When an investment of any kind is made, one of the first questions is usually: “What is the return?” With IBR, the simple answer is \$11.6 billion in gross economic activity on \$5.9 billion in project capital expenditures, including a projected \$3.6 billion in net new economic activity in the form of federal discretionary grants that will be expended locally.

The dollars invested in the IBR program will reap major impacts in three distinct ways: direct, indirect, and tertiary. The project will help create or sustain 18,700 engineering and construction job-years through completion (direct), with an additional 24,600 positions (indirect and tertiary) through contractors and firms that provide raw materials, support services, and logistics. Tertiary impacts represent earnings extended out in the form of rent payments, groceries, utilities and all the other ways that salaries and earnings flow through the community generating jobs created across all economic sectors as a result of this project.

### 4. NEXT STEPS

This EIA represents an initial assessment of the jobs, earnings, and total output or economic activity that is likely to be generated within the bi-state regional economy due to undertaking the construction of the IBR program. The 2022 IBR cost estimates will be periodically updated as the program’s risk identification and mitigation evolve. As the IBR program cost estimates become more

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detailed and refined with additional design work and environmental analysis, this EIA may be updated to better reflect the additional scope and cost accuracy. In particular, options for refinement may include:

- Refine impact assessment based upon future, more detailed IBR program cost estimates with more disaggregated labor and material cost categories and associated economic multipliers.
- Potentially incorporate the ongoing impacts of operations post completion.
- Assess the most-impacted industries.
- Package the EIA results alongside future economic benefit-cost analysis prepared as part of federal discretionary grant applications, explaining the differences in the information that these two types of studies convey.