Treasure Valley Reload Center
Market Feasibility Study

September 21, 2018

Prepared for:
Malheur County Development Corporation

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Acknowledgments

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ECONorthwest prepared this report for the Malheur County Economic Development Corporation. It received substantial assistance from the Malheur County Economic Development Corporation, Terry Tate and Shawn Marshall with RailPros, Brad Baird with Anderson Perry, Ryan Neal with the Port of Morrow, and the many growers, shippers, and businesspeople that met with us during the stakeholder interviews. Other firms, agencies, and staff contributed to other research that this report relied on.

That assistance notwithstanding, ECONorthwest is responsible for the content of this report. The staff at ECONorthwest prepared this report based on their general knowledge of economics, natural resources, agriculture, transportation, and on information derived from government agencies, private statistical services, the reports of others, interviews of individuals, or other sources believed to be reliable. ECONorthwest has not independently verified the accuracy of all such information and makes no representation regarding its accuracy or completeness. Any statements nonfactual in nature constitute the authors' current opinions, which may change as more information becomes available.

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Executive Summary

Malheur County Development Corporation is proposing the development of the Treasure Valley Reload Center (TVRC) in Nyssa, Oregon. The site is centrally located in the Treasure Valley which includes Malheur County (OR), Payette County (ID), Washington County (ID), Canyon County (ID), and the northern portion of Owyhee County (ID). The site's location along the Union Pacific Railroad (Union Pacific) mainline and near US Highways 20, 26, 201, and 95 makes it ideal to serve as a centralized reload center for the valley's natural resource-based economy.

The proposed TVRC would serve the agricultural community in the Treasure Valley by providing infrastructure to transfer agricultural products from trucks to rail. The TVRC has the potential to provide public benefits by reducing the number of trucks using the highways in eastern Oregon, which potentially would lower highway maintenance costs, improve air quality, and decrease carbon emissions. The project would produce positive economic impacts through increased local spending and creating employment opportunities. The goal of this study is to analyze the facility's potential operations under different scenarios, understand the financial and economic conditions for successful operations, and quantify the potential public benefits that would be realized.

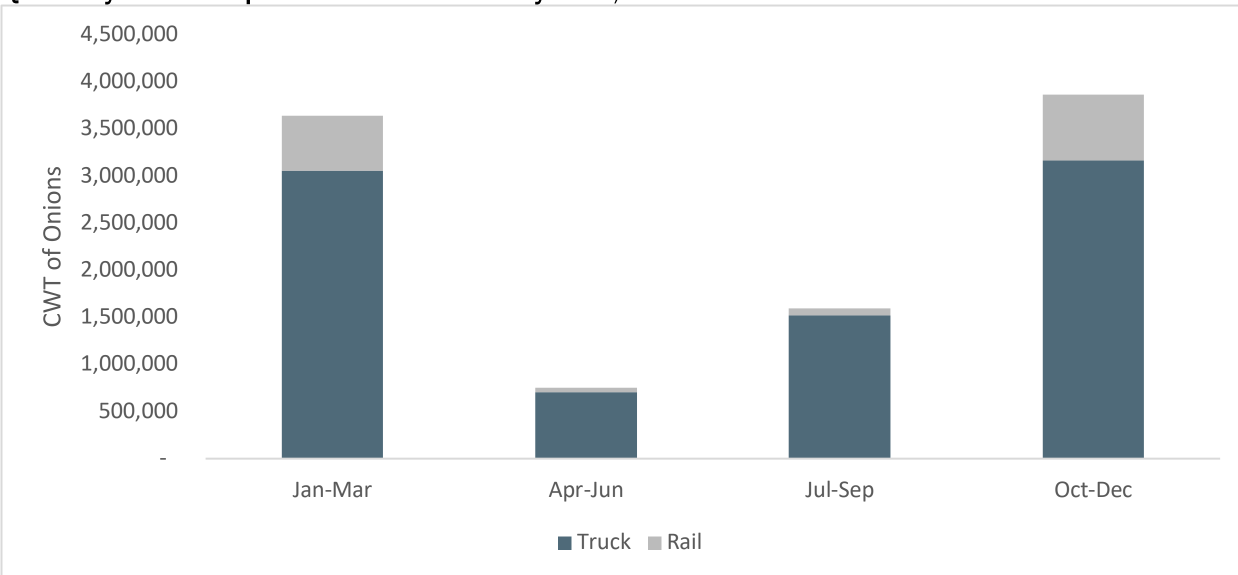
Stakeholder Interviews

As part of the study, stakeholder interviews were conducted with representatives from the agricultural production and shipping industries. These interviews provide insight on how the construction of the TVRC would affect agricultural production and transportation in the region. Interviewees identified reliability, timeliness, quality/frequency of service, and price as motivating factors in their mode-choice decisions.

Commodities and Products Likely to be Served

The Treasure Valley collectively grows over 40 percent of the onions in the Pacific Northwest, with over 19,000 acres harvested each year. Over the past five years, an average of 490,000 tons of onions has been shipped out of the region each year to customers throughout the United States. About 86 percent of these onions move to their final destinations by truck, with the remainder traveling by refrigerated rail car, either through existing rail access in the Treasure Valley or via the ColdConnect facility in Wallula, Washington. This market is seasonal, with 76 percent of the onions shipped between October and March of each year.

Quarterly Onion Shipments out of the Study Area, 2013-2017

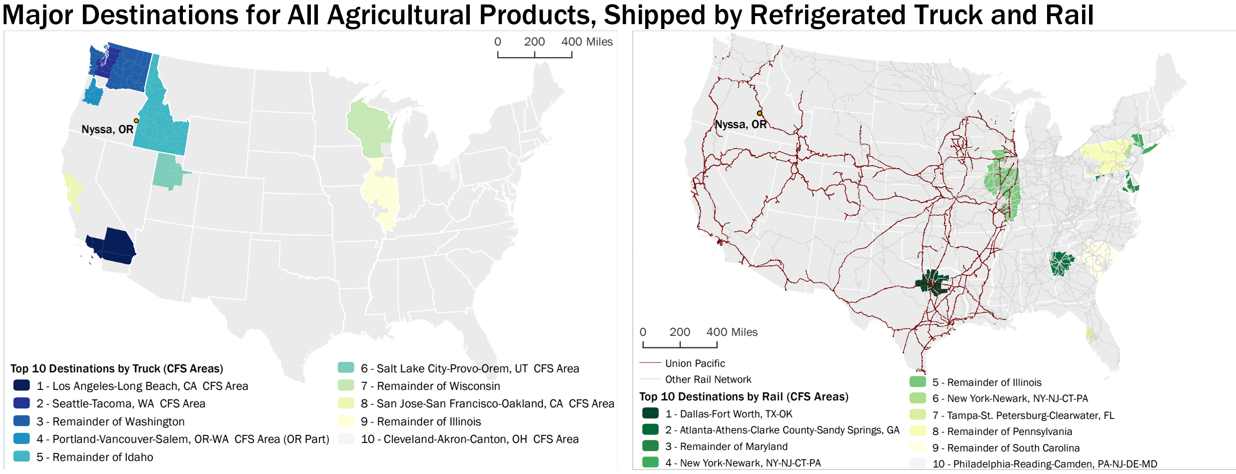


Source: ECONorthwest analysis of USDA Specialty Crop Data

Typical Market Destinations

Agricultural products produced in the region are shipped to a broad set of domestic customers, with southern California and the upper Midwest (Illinois and Wisconsin) serving as the primary destinations for truck shipments. Dallas, Atlanta, and the mid-Atlantic (Maryland, Pennsylvania, and New Jersey/New York) serving as primary destinations for rail shipments. Discussions with onion shippers in the region indicate that the vast majority of their products travel to destinations east of Oregon, both by truck and rail.

Major Destinations for All Agricultural Products, Shipped by Refrigerated Truck and Rail

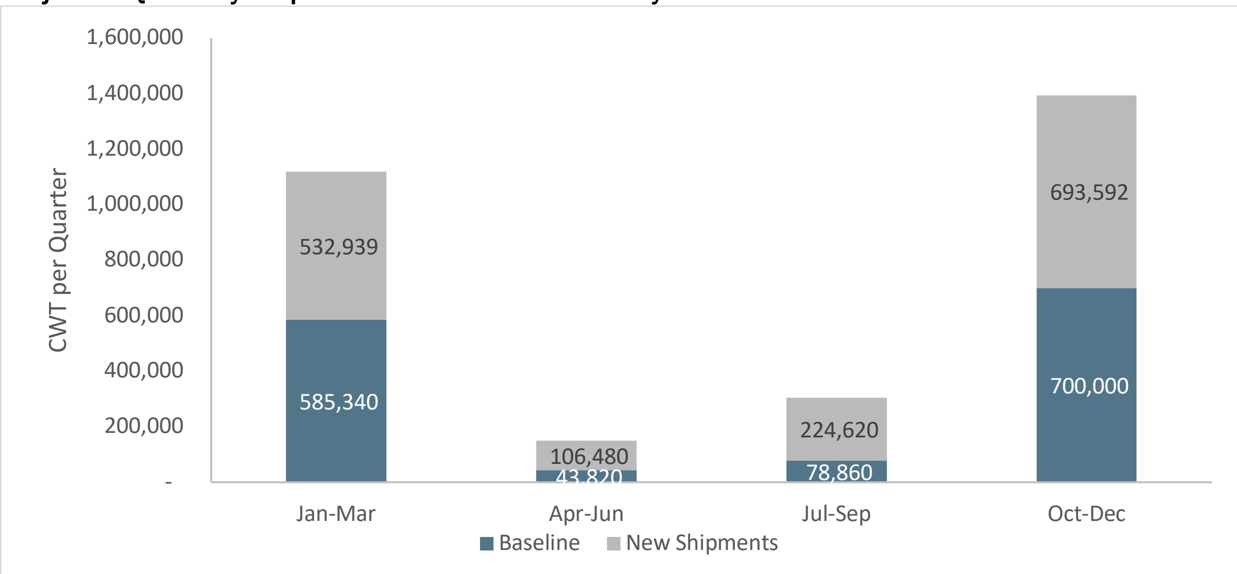


Source: ECONorthwest analysis of 2012 Commodity Flow Survey data; All products traveling by refrigerated truck or rail.

Market Share in the Area That Would Use the Facility

Market analyses of existing commodity flow and agricultural production data combined with stakeholder interviews indicate the expected level of rail service needed. Although the majority of products are still likely to travel by truck, the analysis indicates that there is sufficient demand to support 1.1 – 1.4 million CWT per quarter during the peak season (October through March), and 150 – 303 thousand CWT during the low season (April through September). Approximately 48 percent of these are expected to be new shipments, while the remainder will be substitited from existing rail sidings in the area.

Projected Quarterly Shipments out of Treasure Valley Reload Center



Source: ECONorthwest

Rail cars vary in size, and depending on loading technique, can carry different volumes. Quarterly shipments in CWT, 1,200 CWT capacity rail cars, and 1,600 capacity rail cars are shown below. This amounts to 86-107 thousand CWT per week, and between 54-67 and 72-89 rail cars per week in the high season.

Projected Quarterly Shipments out of the Treasure Valley Reload Center

Quarter	Shipments (CWT)	Rail Cars (1,200 CWT)	Rail Cars (1,600 CWT)
Jan-Mar	1,118,000	932	699
Apr-Jun	150,000	125	94
Jul-Sep	303,000	253	189
Oct-Dec	1,394,000	1,162	871

Source: ECONorthwest

The results of the stakeholder interviews with an opportunistic, self-selected sample are roughly consistent with this estimate. The fourteen interviewees suggested they would ship a total of 119 thousand CWT per week (1.5 million CWT per quarter) during the peak season.

Anticipated Transportation Cost Savings

Private transportation cost savings may accrue to users of the facility who face lower transportation costs than current alternatives. These benefits only accrue if user fees are lower than alternative shipping modes that provide the same level of service. Since, the current mix of shipping alternatives will continue to exist, allowing growers and shippers to choose the alternative that provides the best level of service, reliability, and timeliness necessary. Calculation of the scale of anticipated private benefits, however, is performed using expected demand, expected trucking costs, and a basic set of assumptions on markets served. Under full utilization, is private transportation cost savings are expected to total $1,831,000 per year. When evaluated over a twenty-year timeframe—from 2020 to 2040—at a 3 percent and 7 percent discount rate, these savings amount to between $18,129,000 and $26,448,000. These transportation cost savings are likely to be captured in the private market by either growers, shippers, the facility operator, or Union Pacific.

Size and Scale Necessary to Support Operation

The TVRC will include a 60,000 square foot warehouse with railroad tracks on one side and loading docks on the other side. Local shippers will back their trucks into the loading docks and unload their product into the warehouse. From the warehouse, operators will load product onto refrigerated rail cars when the train arrives. The warehouse will provide temporary storage capacity for product shipping on the next train. The site is large enough to accommodate additional warehouse development, which could increase future storage capacity and provide additional storage options, such as cold storage.

The rail component of the TVRC will consist of a support track with 7,000-foot minimum clearance from the Union Pacific mainline. Two additional support tracks will be available to set out inbound cars and pull out with outbound cars. There will be sufficient switching length to shove a full cut of cars onto either loading tracks. There are sufficient track centers planned to allow for additional expansion[1] in the future for two support tracks with 7,000-foot clearance each, two more storage tracks, and two more working tracks. These additional support tracks and storage tracks would support any industrial customers that develop in the future industrial park adjacent to this facility on the Malheur County property.

Financial Feasibility of Operations

The financial feasibility of the TVRC is calculated using a financial operating model, which includes fixed and variable operating costs associated with all operations at the facility. Based on estimated demand for the facility and available market data and operating inputs from a comparable facility at the Port of Morrow, Oregon, it is expected that the facility will generate over $720,000 in revenue in each year of operation once build-out is complete. This is sufficient to support continuous operation of the facility. At full build-out, this facility will require 7 full-time-equivalent staff, one facility manager, plus approximately 13 to 19 seasonal staff during the peak season.

[1] This analysis only includes planned construction funded by the State of Oregon in Phase 1.

Financial Feasibility of Demand Estimated for Treasure Valley Reload Facility

Year	1	2	3	4	5
Build out	50 percent	80 percent	100 percent	100 percent	100 percent
Revenues	$1,064,657	$1,703,451	$2,129,313	$2,129,313	$2,129,313
Expenses	$1,007,458	$1,249,398	$1,382,615	$1,342,139	$1,382,403
Depreciation	$24,500	$24,500	$24,500	$24,500	$24,500
Net Income	$32,698	$429,553	$772,198	$762,674	$722,410

Source: ECONorthwest

Anticipated indirect job and economic impacts are calculated using a standard input-output model and include direct, indirect, and induced impacts from construction and operational expenses. The construction of the facility and rail line will support $18.2 million in direct output, $5.5 in direct labor income, and 148 direct construction jobs. Spending circulates through the local economy resulting in indirect and induced effects. Combined with the direct effects, construction generates a total of $23.7 million in output, $7.1 million in labor income, and 199 jobs. The operations of the facility will support $2.1 million in output, $1.2 in labor income, and an average of 16 jobs (full-time equivalents) every year. Summing the direct, indirect, and induced effects results in $2.7 million in total output, $1.4 million in total labor income, and approximately 21 total jobs supported by the facility.

Public Return on Investment Analysis

Public benefits to the residents of Oregon accrue when goods that are non-rival and non-excludable are improved. Although the values can often be inferred from private market transactions, public goods are not regularly bought and sold. This analysis draws information from published economic literature and relevant federal guidance to calculate a range of accruing benefits to Oregon residents from the construction of the TVRC. It is expected that the facility will generate between $1 and $1.8 million in benefits during full operation from removing trucks from roadways in Oregon. Over 20 years of operation, this amounts to between $10 and $26 million in total.

Potential Annual Benefits, in 2018 dollars

Category of Public Benefit	Low Estimate	High Estimate
Potential value of fatalities prevented	$116,000	$116,000
Potential value of highway accidents avoided	$15,000	$27,000
Social Cost of Carbon	$46,000	$283,000
Human Health	$774,000	$774,000
Air Pollution Reduction	$58,000	$58,000
Reduced Highway Road Maintenance	$0	$521,000
Total	$1,009,000	$1,779,000

Source: ECONorthwest

Bottom Line

The proposed Treasure Valley Reload Center can serve transportation needs in the region by providing direct regional access to the nation's rail network. The analysis contained in this report estimates that, once fully operational, economic conditions indicate that the reload center will be able to operate in a financially feasible manner, produce significant regional economic impacts, and potentially generate sufficient public benefits to generate a 1-to-1 return on investment for the State of Oregon.

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1 Introduction

1.1 Background

The Keep Oregon Moving bill (House Bill 2017-A) passed in 2017 authorized $25 million for the Oregon Department of Transportation to fund an intermodal facility[2] in the Treasure Valley to enhance shipping capabilities for regional businesses.

The Malheur County Development Corporation (MCDC), has proposed building a truck-to-rail reload facility on a rail-adjacent site in Nyssa, OR. MCDC is a 501(c)4 non-profit economic development organization, and is sponsoring the development of this facility.

The proposed Treasure Valley Reload Center (TVRC) will allow local businesses to unload and reload their commodities from truck-to-rail. This facility has the potential to generate local economic benefits through increased local spending and the creation of additional employment. Additionally, the facility may provide public benefits through lower highway maintenance costs, reduced congestion, and decreased carbon emissions. These benefits will become realized only if the facility is built and operated as described throughout the analysis.

MCDC has retained ECONorthwest to conduct this economic and financial feasbility study to evaluate the potential demand, evaluate necessary capital and operating costs, analyze the economic impacts, and calculate public benefits of the TVRC.

1.2 Goals of This Study

This report analyzes the economic and financial feasibility of the TVRC in an attempt to understand the conditions in which the facility needs to operate to be successful over the long term. The Oregon Legislature directed funding to this facility through Oregon House Bill 2017, so the decision about *whether* to invest in the TVRC is not in question. Instead, the goal of this study is to analyze the facility's potential operations under different scenarios, understand the financial and economic conditions for successful operations, and quantify the potential public benefits that would be realized.

This results of this study inform the facility design, configuration, and operations, to help understand the optimal conditions for operating success. This study is not designed to advocate for a particular project, outcome, or design, but rather present a defensible evaluation of the underlying economic conditions and potential operating scenarios.

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[2] In House Bill 2017 the Treasure Valley project is referred to as the "Treasure Valley Intermodal Facility." (HB 2017-A, Page 79) Interviews with stakeholders and discussions with the project team clarified that the activities supported by this facility are *reload* in nature, rather than *intermodal.* For this reason, this report uses the term reload instead of intermodal to describe the facility and its activities.

1.3 Definitions

Throughout this report, the following definitions for common terms are used:

CWT—"Hundredweight." Unit of mass equal to 100 pounds. This is the standard unit of mass used in the onion shipping industry.

Rail Car—A refrigerated vehicle used to transport perishable goods across railways; either, 50-64-feet or 72-feet in length. Depending on the size, can hold between 1,200 to 1,600 CWT of onions.

Reload Facility—Facility that facilitates unloading product from one mode of transportation and into another mode of transportation. In this case, product would typically move through the facility from a truck to a refrigerated rail car. Does not provide long-term storage capacity.

Tons—2,000 pounds, or 20 CWT.

1.4 Organization of this Report

The economic and financial feasibilty analysis is composed of the following study elements:

1. Introduction

The introduction outlines the purpose and goals of the report.

2. Literature Review

The literature review summarizes the conclusions of feasibility studies of other similar facilities in the United States that provide useful context and specific considerations for the current study to address. The literature review also includes the conclusions of government reports that provide similar contextual information.

3. Stakeholder Interviews

During the course of research, a series of interviews were conducted with a variety of stakeholders, transportation industry professionals, and potential customers of the TVRC, including agricultural producers and shippers. This section descibes the findings of these interviews and provides a summary of the issues raised. An informal estimate of the number of CWT shipped for those who said they may use the facility is also developed. Information collected in the interviews motivate subsequent data collection and analysis.

4. Market Description

The scope and characteristics of the potential market for the TVRC is developed using several data sources. A quantitative estimate of the universe of goods that may use the facility is constructed, which serves as an input in the estimation of demand in the following section.

5. Demand Estimation

An estimate of the existing demand for commodity transport as well as the potential latent demand for additional transportation capacity provided by the TVRC is developed. Assignment of flows to highway and rail modes is constructed using existing information and standard econometric techniques. Projections of future utilization are developed based on a series of potential scenarios designed to represent the range of exogenous effects such as changes in the market prices of commodities, truck transportation costs, or production.

This information is joined with publicly available data on transportation costs, methods, destinations, volumes, weights, commodities, and time of year, to frame a conceptual model of how the TVRC could integrate into the existing regional and national commodity market.

5. Capital and Operating Cost Analysis

An evaluation of the TVRC operating costs is developed via an evaluation of the fixed and variable costs of operations. Using estimates of demand for the facility, a cash flow analysis is conducted to evaluate the break-even price for transport through the TVRC and the series of operational benchmarks necessary to ensure the financial feasibility of the TVRC.

6. Economic Impacts Analysis

Using an economic input-output model, this section calculates the potential direct, indirect, and induced economic impacts to the local economy resulting from the spending generated by this facility.

7. Public Benefits

The potential public benefits of the facility are calculated, including those generated via expected reduced highway accidents, carbon emissions, air pollution, and highway maintenance costs.

8. Conclusions

A description of the largest factors influencing the long-term success of the facility based on current market conditions and scenario modeling as well as exogenous factors that facility operations will need to monitor.

2 Literature Review

This literature review summarizes the existing research on reload facilities in the United States and discusses the data sources used to evaluate the potential demand for the proposed TVRC.

2.1 Trucking Industry Challenges

Recent macroeconomic trends in the trucking industry—namely factors affecting the price of trucking—have contributed challenges for producers shipping goods within the United States These factors include Federal Motor Carrier Safety Administration regulations on driving hours, the availability of truck parking, and the shortage of truck driver labor. All have the potential to reduce truck availability, thereby increasing costs and influencing shipping decisions.

The trucking industry is highly cyclical and is experiencing record demand coupled with supply constraints. According to FTR Transportation Intelligence, orders for heavy semi-trucks in June 2018 were the highest ever recorded and up 140 percent from the year prior.[3] is growth is expected to continue, with the Bureau of Transportation Statistics projecting that trucks will be moving 16.5 billion tons by 2045, an estimated 43 percent increase from 11.5 billion in 2015.[4] Further, the agency projects that long-haul freight truck traffic on national highways may increase from 282 million miles per day in 2012 to 488 million miles per day by 2045—a 73 percent increase.[5]

Regulations limiting driving time

The Federal Motor Carrier Safety Administration recently implemented rules regarding the hours of service (hours of service "HOS" rule) that truck drivers are able to operate in. These rules are designed to eliminate drowsiness that can lead to crashes while operating a commercial motor vehicle (CMV).[6] Tracking and adhering to these restrictions can be logistically onerous. Originally, drivers tracked these hours manually, leading to increased driver administrative burden. However, tracking is now performed electronically following the implementation of the electronic logging device (ELD) rule. This rule aims to improve highway safety and reduce the paperwork burden by requiring the use of electronic logging devices for

[3] Richter, Wolf. 2018. "The trucking industry is in a capacity crisis – but it's just part of the business cycle." *Business Insider*. July 9. Retrieved from http://www.businessinsider.com/trucking-industry-capacity-crisis-just-part-of-the-business-cycle-2018-7

[4] U.S. Department of Transportation, Bureau of Transportation Statistics. *Freight Facts & Figures 2017 – Chapter 3 The Freight Transportation System*. Retrieved from https://www.bts.gov/bts-publications/freight-facts-and-figures/freight-facts-figures-2017-chapter-3-freight

[5] *Ibid.*

[6] Federal Motor Carrier Safety Administration. *Hours of Service.* Retrieved from www.fmcsa.dot.gov/regulations/hours-of-service

hours of service compliance.[7] However, for some truck drivers, this regulation imposes costs and a reduction in take-home pay because of less flexible adherence to the HOS rule. Furthermore, truckers who had not previously worked with ELDs have had to invest in new equipment and develop new processes for tracking hours.

Parking and driver shortages

In a report to Congress in 2012, the Federal Highway Administration identified truck parking shortages as a growing constraint on the trucking industry.[8] The inadequate supply of truck parking requires drivers to spend time looking for parking, making it more challenging to comply with HOS regulations. It is difficult for drivers to make up for this lost productivity because the ELD is keeping track of time spent on duty.

Collectively, the HOS rule, ELD rule, and truck parking shortage combine to exacerbate the current truck driver shortage by reducing industry productivity: increased regulations require more trucks and drivers to move the same amount of freight. Additionally, the recent strong economy and low unemployment rates mean that the trucking the industry faces strong competition for labor. An aging workforce and the industry's inability to tap into a younger population and the female workforce also contribute to the shortage. Moreover, the lifestyle associated with being a truck driver may be undesirable to some.

The growth in the driver workforce has not paralleled the growth in the shipping industry, which has implications for the shipping industry as a whole. The American Trucking Association found that if current trends hold, the truck driver shortage could reach more than 174,000 drivers by 2026 up from 50,000 in 2017. This lack of supply coupled with record demand for truck freight pushes labor costs higher which translates into higher freight prices for shippers.

2.2 Long-Haul Transportation Trends

One of the most significant factors facing shippers in the Treasure Valley is the allocation and availability of refrigerated rail cars. Other important factors include increased use of freight and the overwhelming market share of the Union Pacific Railroad (Union Pacific).

Allocation of rail cars

Refrigerated rail cars are generally owned by the rail lines and must be leased by shippers. As such, rail lines tend to allocate cars at their discretion, often favoring high-volume areas and high-value products. Wherever demand for cars is not supplied, a misallocation occurs, and reduces the efficiency of domestic freight trade.

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[7] U.S. Department of Transportation, Federal Motor Carrier Safety Administration. *Federal Register*. December 16, 2015. Retrieved from www.gpo.gov/fdsys/pkg/FR-2015-12-16/pdf/2015-31336.pdf

[8] U.S. Department of Transportation, Federal Highway Administration. 2012. *Commercial Motor Vehicle Parking Shortage*. May. Retrieved from ops.fhwa.dot.gov/freight/documents/cmvrptcgr/cmvrptcgr052012.pdf

Due to a misalignment between shipments coming into a city and shipments leaving the city, there remains a major imbalance of trade in the United States.[9] Cities that depend on imports experience a build-up of vacant rail cars, while cities that are export-heavy have trouble accessing rail cars to ship their goods in. Despite the low capacity of cars in export areas, there is a surplus of freight cars in the United States—allocation to maximize use (not moving empties) is a logistics puzzle.[10] Storing or shipping empty cars is highly costly and inefficient: not only do they prohibit shippers from generating revenue, they also delay shipments of other goods. A loaded freight will wait to depart until there are no empty cars at its final destination—until any empty cars are filled and shipped or moved off the tracks.[11] This pattern of misallocation suggests that Treasure Valley shippers will likely find it difficult to access all rail cars, including temperature-regulated cars.

Additionally, the supply of boxcars is dropping significantly. Between the years 2005 and 2015, the number of boxcars in North America declined by 41 percent.[12] Furthermore, 60,000 cars are expected to be retired (50 percent higher than normal) with only 41,000 new deliveries anticipated.[13]

Market share held by Union Pacific

The rail industry operates primarily as an oligopoly, with a limited number of companies capturing a large share of the market. Approximately 60 percent of all available rail equipment is controlled by five leasing companies, and the largest 13 companies control 90 percent of available equipment.[14] In 2017, Union Pacific expanded its fleet of refrigerated rail cars by acquiring Railex. The refrigerated Railex cars directly service Union Pacific's facilities in: Wallula, Washington; Delano, California; and Rotterdam, New York.[15] As of the first quarter of

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9 Kloster, Richard. Outlook 2018. Progressive Railroading. December 2017. Retrieved from https://www.progressiverailroading.com/rail_industry_trends/article/Outlook-2018-Rail-car-forecast-by-Richard-Kloster--53418

10 *Ibid*.

11 Haghani, Ali E. "Rail freight transportation: a review of recent optimization models for train routing and empty car distribution." *Journal of Advanced Transportation* 21.2 (1987): 147-172.

12 Tita, Bob. 2015. "Shortage of Railroad Boxcars has Shippers Fuming." *Market Watch.* June 21. Retrieved from https://www.marketwatch.com/story/shortage-of-railroad-boxcars-has-shippers-fuming-2015-06-21

13 Kloster, Richard. Outlook 2018. Progressive Railroading. December 2017. Retrieved from https://www.progressiverailroading.com/rail_industry_trends/article/Outlook-2018-Rail-car-forecast-by-Richard-Kloster--53418

14 Rodrigue, Jean-Paul, Claude Comtois, and Brian Slack. 2009. *The Geography of Transport Systems*. Routledge. Retrieved from https://transportgeography.org/?page_id=9481

15 Braden, Dustin. 2017. "UP Asset Acquisitions Strengthen Reefer Capabilities." *JOC.* Jan 4. Retrieved from https://www.joc.com/rail-intermodal/class-i-railroads/union-pacific-railroad/asset-acquisitions-strengthen-reefer-capabilities_20170104.html

2018, Union Pacific held 58 percent of the agricultural segment market share, 50 percent of the automotive segment market share, and nearly one-third of the entire market share.[16]

Rail transportation prices in the United States are regulated by the Staggers Act of 1980.[17] In situations where shipping customers have multiple shipping mode options (e.g. highway or barge), railroads have the flexibility to provide a level of service and set prices according to market conditions. Differential pricing is used to optimally price discriminate and allocate limited services to the highest demand. Rail rates are only regulated where competition for transportation services is limited. The Staggers Act contains a process for special rate cases to be set, evaluated, and adjudicated. Treasure Valley shippers are not subject to regulated rail transportation prices.

2.3 Existing Reports and Case Studies

A broad set of relevant past research and literature relating to the TVRC exist. A subset are summarized below. These detail the agricultural commodities, shipping methods, demand for rail access, economic methodology for determining latent demand, and assessments of prior proposed facilities relevant to the region.

State of Oregon Agriculture Industry Report[18]

The Oregon State Board of Agriculture produces an Industry report on a biennial basis describing the state of agriculture in Oregon and priorities for investment. Southeast Oregon, especially Malheur County, is known for producing livestock, hay, potatoes, and onions. The region faces drought conditions that make crop rotation difficult. The report notes that the region needs "affordable options for reliable domestic transportation." According to the Oregon Department of Agriculture, there are 3.9 million acres of land in farms in Southeast Oregon, and there are nearly 3,000 farm operations.

Feasibility of an Intermodal Transfer Facility in the Willamette Valley, Oregon [19]

ECONorthwest completed a feasibility study for a potential intermodal facility in Oregon's Willamette Valley in 2016. This feasibility study was conducted to evaluate the economic and financial sustainability of potential Oregon Department of Transportation Funding for an intermodal facility somewhere in the Valley. The potential demand for the facility, economic

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[16] UNP Sales vs. its Competitors Q1 2018. *CSI Market*. https://csimarket.com/stocks/compet_glance.php?code=UNP

[17] S. 1946 — 96th Congress: Staggers Rail Act of 1980.

[18] State Board of Agriculture. 2017.*State of Oregon Agriculture Industry Report from the State Board of Agriculture*. Retrieved from https://www.oregon.gov/ODA/shared/Documents/Publications/Administration/BoardReport.pdf , p.32

[19] ECONorthwest. 2016. *Feasibility of an Intermodal Transfer Facility in the Willamette Valley, Oregon.* Business Oregon & Infrastructure Finance Authority. Retrieved from http://www.oregon4biz.com/assets/e-lib/IT/ITFrpt1216.pdf

impacts, public benefits, and financial sustainability evaluated in this report form a foundation for the analysis of the TVRC.

Determining the Potential Economic Viability of Inter-Modal Truck-Rail Facilities in Washington State[20]

Conducted by researchers in Washington State for the Washington Department of Transportation and the Federal Highway Administration, this study[21] developed an applied methodology for determining the potential economic viability of intermodal truck-rail facilities in Washington State. The methodology identifies attributes, characteristics, and market situations that are associated with successful intermodal facilities. The report presents the framework, supported by a detailed literature review and a review of a broad set of case studies of intermodal facilities throughout the United States and Canada.

The authors present several conceptual models that identify the most relevant and important variables for assessing the economic and financial viability of intermodal facilities. These variables are categorized in Figure 1 below.

Figure 1. Factors Found to Be Important in Intermodal Truck-Rail Facilities

Locational Variables	Facility Variables
Adequate land and space for the facility	Adequate facility capacity
Appropriate distance from markets (supply and demand markets)	Services that are demanded by the market
Appropriate mix of local commodities	Time to build the facility
Appropriate prices of local goods relative to shipping costs	Degree of automation in the facility
Incentives in the local tax or zoning code	Cost of labor
Access to various modes of transport (class 1 railroads, major highways, population centers)	Operational efficiencies
Availability of local labor	Ownership structure
Proximity to population center	Adequate public support
Adequate volumes (demand)	Adequate relationship with DOT and railroads

Source: Casavant, K., E. Jessup, and A. Monet. 2004. Determining the Potential Economic Viability of Inter-Modal Truck-Rail Facilities in Washington State

The authors also identified factors that were important for ongoing financial sustainability, including the following:

1. A clear place for the facility in the market (proximity, sufficient volume, and perceived value for users)

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[20] Casavant, K., E. Jessup, and A. Monet. 2004. *Determining the Potential Economic Viability of Inter-Modal Truck-Rail Facilities in Washington State.* Washington State Transportation Commission, Washington State Department of Transportation, and U.S. Department of Transportation, Federal Highway Administration. December. Retrieved from http://www.wsdot.wa.gov/Research/Reports/600/605.1.htm

[21] *Ibid*.

2. Elements within the supply chain to compete (cheapest transport alternative, sufficient volume, connectivity, enough control of other pieces of the market, and appropriate operating cost)
3. A sustainable business model (sufficient volume, efficiency of operations, and appropriate operating costs)

Northwest Seaport Alliance: Inland Port Impact on Growing the Agricultural Industry[22]

In 2017, the Northwest Seaport Alliance evaluated the potential benefits that inland ports can offer to their state's agricultural industry. The potential facility in question would be one that could offer transload, intermodal, and trade processing operations providing the state's agricultural producers more options for shipping products and securing empty containers.

In evaluating the potential benefits to the local and state economy, the analysis found that the presence of an inland port could:

- Increase business relocation to the area
- Benefit existing businesses through efficiencies and economies of scale (with direct and indirect economic impacts via construction spending and payroll increases)
- Improve regional infrastructure
- Create local jobs
- Reduce congestion on local roads
- Reduce carbon emissions by increasing rail usage

Case Study: Port of Benton, Washington[23]

In 2017, BST Associates prepared a market analysis of the rail line near Richland, Washington for the Port of Benton. The Port was exploring the possibility of expanding by about 2,500 acres along a rail line and the report evaluates the market potential to develop new rail cargo (both domestic transportation and international trade) and summarizes the economic contribution that the new development could provide to the local economy.

The report found that economic conditions could allow the Port to offer a container shuttle service between the Port in Tri-Cities Washington and the Ports of Seattle and Tacoma. The report noted the following conditions needed to occur for the facility to be successful:

- Adequate volumes need to be secured and consistent service needs to be maintained
- Empty containers would need to be diverted to the facility

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[22] Northwest Seaport Alliance. 2017. *Inland Port Impact on Growing the Agricultural Industry.* Retrieved from https://drive.google.com/file/d/0BxcR6bGtc43Vcm81TURzX3Z2bmM/view

[23] BST Associates. 2017. *Port of Benton Rail Line Market Analysis*. Retrieved from http://portofbenton.com/tricities/wp-content/uploads/2016/06/BSTPOBRailLineMarketAnalysis_1-27-2017-v2.pdf

- Pricing needed to be competitive with local markets and the trucking industry, and
- The facility would need to secure a long-term commitment from one or more railroads.

Due to location constraints and the inability for double stacked containers on the Stampede Pass rail line (which would cause train shipments to travel twice the distance as truck shipments), the report recommends further analysis to understand the Port's potential for intermodal service.

These factors are relevant to the potential Treasure Valley Reload facility because the Treasure Valley facility requires the same conditions to be met in order to operate successfully.

Case Study: Utah Inland Port[24]

Cambridge Systematics and RSG worked with the World Trade Center Utah to analyze the feasibility of an inland port in the northwest quadrant of Salt Lake City. The report explains that Utah can increase competitiveness for higher-value manufacturing by investing in logistics infrastructure. The consultants advocate for a port authority-like model where the government maximizes private partner infrastructure investment. They note that inland ports typically have rail intermodal facilities with warehouses and distribution spaces, as well as local policies that provide free trade zones and tax incentives. Beyond the usual intermodal facilities, the site should have low, medium and high intensity manufacturing spaces as well as airport-oriented high-velocity logistics.

Similar to the Utah Inland Port, the goal of the potential Treasure Valley facility is to increase competitiveness for goods in the region. The team could consider developing facilities specific to the needs of common goods like onions, like the Utah Inland Port site included facilities specific to manufacturing.

Case Study: Port of Muscatine, Iowa[25]

The City of Muscatine analyzed the feasibility of a proposed Port of Muscatine, located on the Mississippi River in Iowa. The report states that the multimodal port, which would allow for trans-loading of intermodal containers, is feasible. A wide variety of commodities could be shipped through the facility, including agricultural products. According to the City, diverting commodities from truck/rail to barge is one of the main purposes of the TVRC. The Muscatine facility would be located on a site with similar conditions to the Treasure Valley facility; it is close to highways, other roads, and industrial facilities. This connection to main thoroughfares is a key component in the facility's success.

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[24] Cambridge Systematics, Inc. & Global Logistics Development Partners, Inc. 2017. *Utah Inland Port – Feasibility Analysis.* World Trade Center Utah. Retrieved from http://wtcutah.com/wp-content/uploads/2018/01/Inland-Port.pdf

[25] HDR. 2017. *Port of Muscatine Planning and Feasibility Study*. City of Muscatine, Iowa. Retrieved from https://www.muscatineiowa.gov/DocumentCenter/View/14728/Muscatine-Port-Feasibility-Study-Report

Case Study: City of Bombay Regional Rail[26]

Franklin County in New York researched the feasibility of a transload facility in the city of Bombay. It considered options for the transloading of boxcars, lumber, hopper cars, or gondolas. Potential customers included various agricultural dealers, but the County had yet to discuss the TVRC with the business owners to determine their interest. The County studied potential business models for the operation of the facility with combinations of public and private management and ownership.

The study considers multiple criteria for facility success: access to track for users not close to a rail line, warehouse space to store goods, and security for multiple users. The Treasure Valley facility will require the same components in order for potential customers to switch to using the facility over their current methods of transporting goods.

Case Study: Central New York Inland Port[27]

The New York State Department of Transportation (NYSDOT) consulted with Resource Systems Group (RSG) to study the feasibility of an inland port in central New York. An inland port typically connects a maritime port to a land-bound site via rail. The study found one viable site for the inland port in Town of DeWitt, at an existing rail yard. In order for the inland port to be feasible, RSG says it must at a minimum have daily train service and produce cost savings for truck drayage and rail service between two ports in New York. Other market factors include the availability of empty containers and the building of warehouses and distribution facilities nearby. Level of train service and availability of existing facilities were two factors also considered when studying the Treasure Valley facility's feasibility.

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[26] Erdman Anthony. 2017. *Regional Rail Feasibility Study Final Report.* County of Franklin Industrial Development Agency, New York. Retrieved from http://www.franklinida.org/sites/default/files/uploads/pdf/2017/Final%20Regional%20Railroad%20Feasibility%20Study%20Report.pdf

[27] Resource Systems Group. 2017. *Central New York Inland Port Market Feasibility Study.* New York State Department of Transportation. Retrieved from https://www.ny.gov/sites/ny.gov/files/atoms/files/Inland_Port_Study.pdf

3 Stakeholder Interviews

To inform the market analysis of the TVRC, the project team conducted a series of stakeholder interviews using an opportunity sample of fourteen stakeholders located in the Treasure Valley. Interviewees includes growers, shippers, packers, and distributors of a variety of crops and commodities, as well as a representative of the Oregon State University Agriculture Extension Program. The majority of interviewees were associated with onions, a major domestic export from the area.

These interviews provided critical insight on relevant factors such as demand for the facility, potential usage, and the current state of the shipping market in the region, all of which affect the feasibility and success of the TVRC. In addition, the interviews shed light on potential negative impacts that the facility may have on certain businesses—an important consideration in analyzing demand. To get a comprehensive understanding of the potential impact of the Nyssa Facility, interviewers asked questions about the following topics:

- Background information on each business to ensure that perspectives were heard from a variety of business sizes, ages, and types
- The commodities dealt with to capture the full market in the Treasure Valley
- Shipment destination, method, and quantity to estimate the potential demand
- Important factors in deciding how to ship products to understand critical decision processes for using rail, truck, or another shipment method
- The Impact the Nyssa Facility might have on each business' operations

The variation in the characteristics of the companies provide a solid foundation for the narrative of the region's businesses and shipping activity and highlight aspects of need within the shipping industry.

3.1 Interview Summaries

All business representatives interviewed are involved in the shipping industry to some extent, with approximately 60 percent processing, packing, or growing agricultural commodities. Several interviewees indicated that they are somewhat vertically integrated from farm to distribution. One interviewee exclusively works as a grower. Most are located within a 60-mile radius of the proposed facility. Approximately 50 percent of interviewees are involved in the onion market, in addition to other agricultural products. Onions are the main commodity of interest amongst interviewees. Other business representatives interviewed are involved in hay production and export, fuel oils, sugar, potatoes, or tree fruits.

A wide array of stakeholders was initially targeted for interviews: various commodity growers and shippers, companies large and small, near to the proposed Nyssa facility and far from it. The following summarizes opportunity sample of participating interviewees:

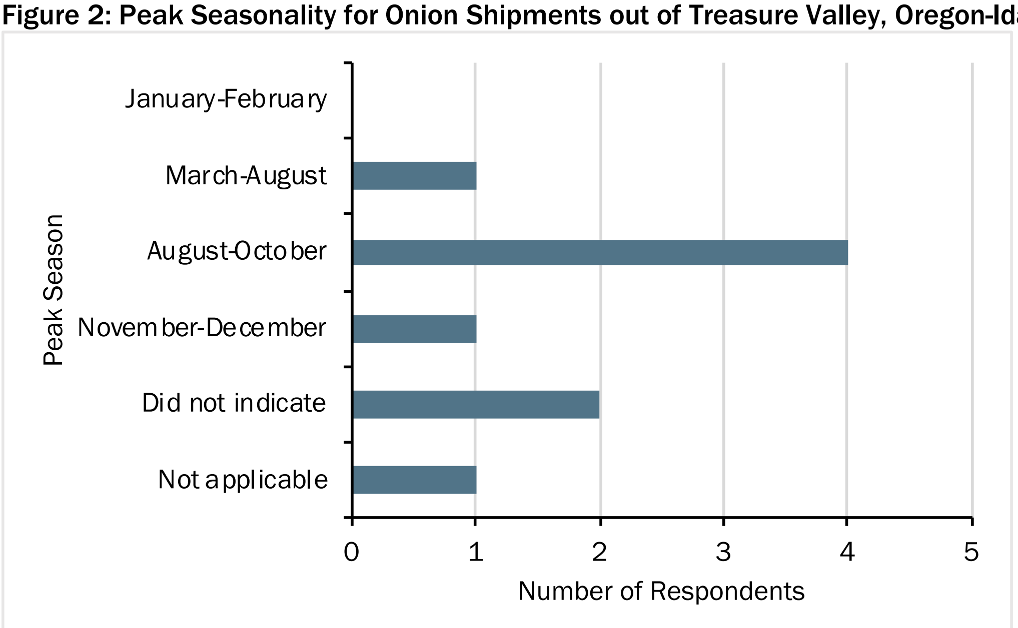
- The companies have been in business ranging from 15 to 120 years.
- Company sizes range from less than ten to over 1,000 full-time employees.
- Most shippers are within thirty miles of the facility, with only one shipper located sixty miles away.
- 50 percent reported having annual total revenues of over $20 million, 20 percent annual total revenues between $15 and $20 million, and 30 percent reported annual total revenues less than $10 million.

Price and price volatility of onions were often cited by interviewees working with onions. Prices can fluctuate dramatically in a short period of time: one company reported that a 50-pound bag of onions can change by $10 in just two or three weeks. This volatility means that profit margins can be impacted by when products arrive to the customers—if products are late by a week or two, sellers may lose money. This volatility and the resulting need for reliability greatly influences choices between shipping methods.

3.1.1 Seasonality

The seasonal nature of agricultural production in the Treasure Valley was a common theme. As a result of refrigerated cold storage facilities in the area, a number of producers interviewed did not have a peak season and have relatively steady shipments year-round. Other interviewees stated their peak season was August through October coinciding with harvest and shipping straight from the fields.

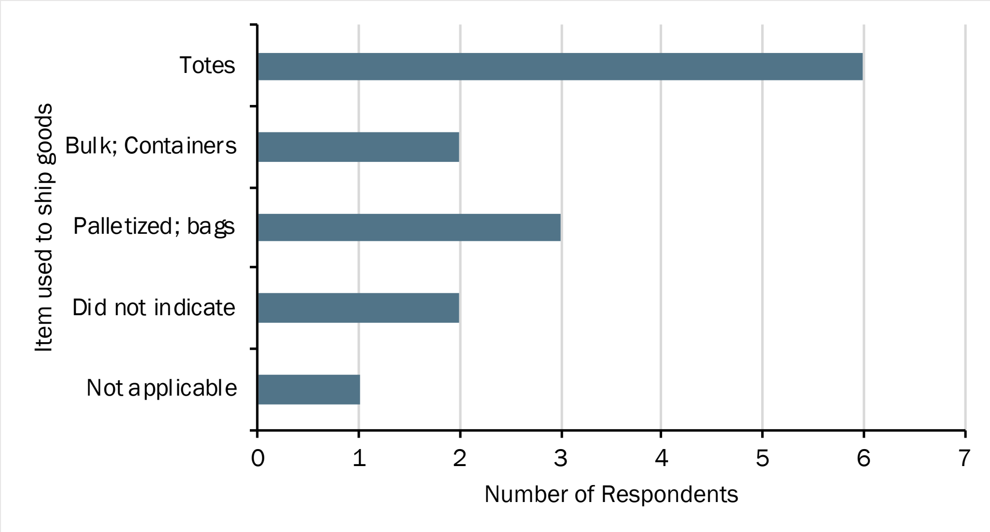
Figure 2: Peak Seasonality for Onion Shipments out of Treasure Valley, Oregon-Idaho



Source: ECONorthwest interviews with Treasure Valley Producers and Shippers on May 31st and June 1st 2018.

Most interviewees ship their onions in palletized totes or 50-pound bags. Some producers palletized their bags of onions, while others left them in bags because hand-stacking bags could increase the number that fit on a rail car.

Figure 3: Method of Onion Storage out of Treasure Valley, Oregon-Idaho



Source: ECONorthwest interviews with Treasure Valley Producers and Shippers on May 31st and June 1st 2018.

3.1.2 Shipping Methods, Destinations, and Factors in Mode Choice

Comments from interviewees were essential in providing local context to the data and in shedding light on the deciding factors related to shipping methods. These qualitative data inform the demand estimation choice model by providing context on behavioral decisions. Onion growers and shippers generally fell into one of three categories:

- Some local producers already have local rail spurs to their production or storage facilities and are able to serve markets that receive by rail. These producers may rely on trucks to get their product to its final destination, or to move product short distances locally.
- Other producers primarily use rail to ship their product but need to truck it to the nearest rail facility in Wallula, Washington.
- Other producers solely rely on truck and may ship their products to destinations that are unable to receive by rail, or to customers that need smaller quantities that would be inefficient to deliver via rail.

Most onion shippers discussed reliability and timeliness in service as critical to their decision on how to ship. Since onions are perishable, most shippers decide transportation mode based on how quickly the product is needed, the volume to ship, and their customer's ability to receive. In general, truck service was said to be more reliable than rail, but each mode has its drawbacks.

Considerations for Rail

A major issue for shipping by rail is the availability of rail-based receiving customers: rail distribution networks serve fewer destinations and may require trucks both from the field to the rail facility at the beginning and from the rail facility to the final destination at the end of the trip. Interviewees considered rail transportation to have more delays, and some interviewees noted frustration in lack of tracking rail cars or the lack of communication about issues in transit.

Another consideration shippers discussed related to reliability is the expected service from Union Pacific at the potential TVRC. Most shippers were looking for guaranteed or committed levels of service, including rail car allocation. Some expressed skepticism that the facility could get this level of consistent service because Union Pacific owns the competing facility in Wallula, Washington. Shippers indicated adequate rail car availability as a necessity for the proposed facility, and implied that they might try using rail (if they didn't already) at the TVRC but would not likely stay with rail unless the service was consistent and adequate. Most shippers suggested that a strong and committed relationship with Union Pacific would be necessary to ensure the facility's long-term success.

Price was also an important factor making rail more attractive than truck. Rail prices are more favorable for longer distances, so shippers sending onions to the East Coast often chose rail. However, interviewees noted that Oregon shippers face competition on the East Coast from growers in the Netherlands. Some shippers noted that East Coast customers who cannot get Oregon onions reliably may switch to European providers. Thus, the market share for Oregon onions may be at risk.

Considerations for Truck

Truck availability is a growing concern, particularly during peak seasons. While generally more reliable and readily available than rail, the trucking industry is facing supply constraints. Some interviewees noted that there might be several truck jobs posted (demand for transport services) for every truck that is available for a given location and delivery time (supply). Some suggested that this imbalance allows truck drivers the opportunity to wait until prices climb. One company said that some trucking companies will make a booking with the shipper even if they do not have trucks available and are instead still searching for a truck. According to this company, this problem does not happen as frequently with the railroads.

Major Destinations

Most interviewees ship domestically across the United States, with limited international exports to Mexico and Canada. It appears that domestically, different Treasure Valley onion suppliers have found their place in the market and have built their supply chains, pricing structures, and customer relationships around the competitive advantages and disadvantages they have. Those with local rail access have found customers in farther distances who accept onions by rail and have set their prices appropriately. Those companies without rail access have found customers to service by truck, either closer to the field or smaller customers needing smaller deliveries.

When discussing current shipping methods, a number of trends emerged from interviewees (many listed multiple factors in their decisions). Most (64 percent) said price was the biggest factor in their decisions between truck and rail. When discussing rail (including those who do and do not ship by rail) 43 percent mentioned factoring in reliability of shipments arriving on time, when they decide how to ship, and 57 percent mentioned rail car availability as a factor. Twenty-nine percent of respondents mentioned shipping via the quickest mode to get their product to market. However, in general, shippers view the availability of rail cars and the price of goods as more relevant than timeliness of shipments.

3.1.3 Likelihood of Facility Use

Five shippers said they would use the facility, and nine said they would not.

The expected shipping volume from interviewees who suggested they would use the facility were calculated as follows. It is assumed that an interviewee's entire shipment volume would move to the TVRC if they indicated they would use it. Volumes were converted from various units and time frames to a common unit of CWT per week. Each interviewee's estimated shipping volume is combined to approximate the total volume shipping through the facility. In total, the interviewees suggested they would ship 119 thousand CWT per week (1.5 million CWT per quarter) during the peak season.

Interviewees who would not likely use the facility, still expressed interest and excitement in the potential benefits the facility could bring to the region. Some companies expressed concern that the TVRC could increase competition in the labor supply pool, making it more difficult for producers, packers, processors and shippers to find workers during the harvest season. Additionally, some interviewees expressed interest in utilizing potential storage capacity that accompanies the TVRC.

3.1.4 Connections to Future Development

Storage Development

Stakeholders indicated that should developers build additional storage capacity on the site in conjunction with the TVRC, demand may exist to utilize it. Cold storage particularly interested onion shippers, as it would enable them to extend their shipping season.

Hay Press and Shipping

The project team spoke with one hay producer from neighboring Harney County, who is in the process of securing investment funding for a hay press that would operate adjacent to the potential TVRC, and potentially benefit from the TVRC's rail access. Growers in Harney County export hay throughout the United States and to Asia. Currently, growers truck hay to presses in Winters (CA), Ellensburg (WA), and Portland (OR) where it is compressed, packaged, and loaded onto trucks or rail cars for export markets through Ports in Seattle and Tacoma (WA) or Long Beach (CA). Trucking hay instead to Nyssa and loading it into intermodal containers that could be railed to ports would potentially reduce Harney County's hay growers' shipping costs by half. Additional work would be required to obtain cooperation from the railroad to haul intermodal containers filled with hay, because the destinations and mode of rail service are different for hay than onions. However, the relationship established with Union Pacific to serve the TVRC could lead to future agreements that expand the scope of activities associated with the TVRC and produce additional economic benefits for the region. Based on this initial interview, the project team determined this line of business could occur in the future, but the current analysis would not address it.

4 Market Description

This section draws from previous studies, stakeholder interviews, and analyses of existing data to develop an estimate of the size of the potential market for the TVRC. Two factors define the estimate of the market for the TVRC, specifically the relevant geography and universe of goods. These are then used to develop a quantification of both exports and domestic shipments out of the Treasure Valley that inform the demand estimation in the next section.

4.1 Geography

The literature review and stakeholder interviews indicate that the economic advantage to transferring products from truck to rail are a function of the relative cost of each mode. Furthermore, it is strongly evident that the ability to move products to their final destination within a single "turn" (i.e. local trucking shipment) is a factor in shipping mode. The distance that a truck can travel within a day is used to inform the likely geography of the users of the MVIP.

Existing regulations require truckers to follow four driving limits at all times:

- Drivers may not work more than 60-hours within 7-days, or 70-hours within 8-days.
- Each workday is limited to a 14-hour "driving window" regardless of what the driver is doing (resting, waiting at a port, etc.)
- Each workday "driving window" limits actual drive time to 11-hours.
- Lastly, drivers must take a 30-minute rest break if 8 consecutive hours have passed since the last off-duty period of at least 30 minutes.[28]

These rules impose a discrete distance threshold that determines whether a shipment travels on a local truck or a long-distance truck. Taking an allowance for uncertainty, this threshold occurs at approximately the 5-hour one-way driving mark, displayed in Figure 4 below.

[28] Federal Motor Carrier Safety Administration. *Interstate Truck Driver's Guide to Hours of Service*. March 2015. Retrieved from www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/Drivers%20Guide%20to%20HOS%202015_508.pdf

Figure 4: Area within a 5-hour drive of Nyssa, Oregon

Source: ECONorthwest

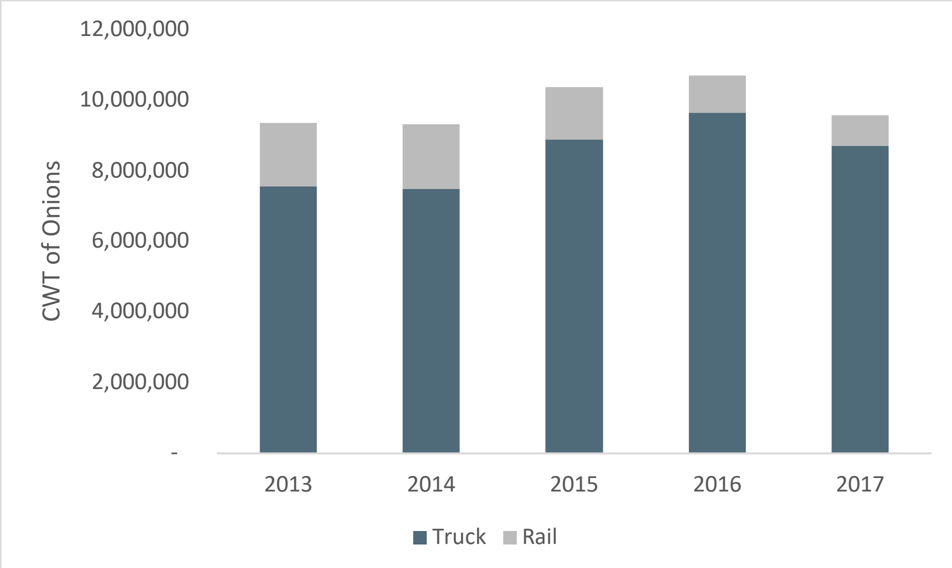
Nyssa, Oregon, sits in a geographic location that allows agricultural producers in the region to consolidate their products efficiently. There are two primary substitute reload facilities with rail access: the ColdConnect facility in Wallula, Washington (near Walla Walla), and rail terminals in Salt Lake City, Utah. Upon construction of the TVRC, shippers in the total shaded area will be able to transfer their goods by truck within a single working day. Those shippers also located within a 5-hour drive of the substitute facilities will make decisions based on the relative cost, timeliness, and reliability.

4.2 Major Commodities

Onion production and export emerged as a driving theme during the stakeholder interviews. Due to the heavy influence of this commodity in this region, it is important to understand the market demand, growing and shipping conditions, and trends for onion production.

There are three primary clusters of onion production, one geographically located near Wallula, Washington, another in southwest Oregon, and a third in the Treasure Valley, centered around Ontario, Oregon. The Treasure Valley collectively grows over 40 percent of the onions in the Pacific Northwest, with over 19,000 acres harvested each year. Over the past five years, an average of 9.9 million CWT[29] (490,000 U.S. tons) of onions has been shipped out of the region each year to customers throughout the United States.

Figure 5. Annual Shipments of Onions from Study Area, 2013-2017

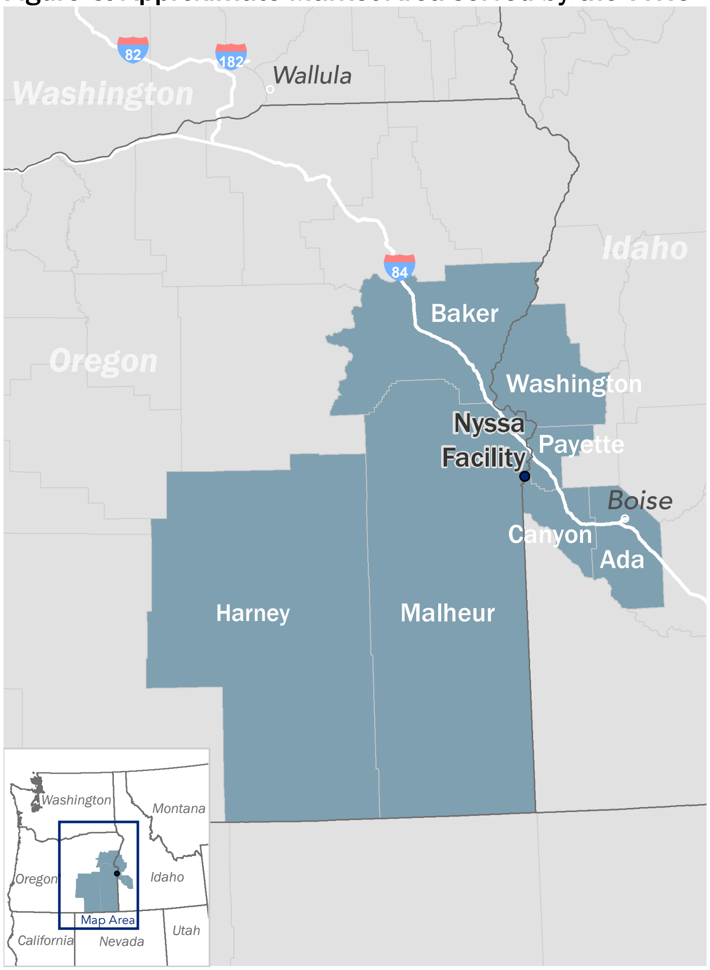


Source: ECONorthwest analysis of USDA Specialty Crop Data

Given the intersection between the driving distances outlined in Figure 4 and regional onion production, the study area is defined as Baker, Harney, and Malheur counties in Oregon, plus Washington, Payette, Canyon, and Ada counties in Idaho (see Figure 6 below).

[29] All quantities are reported in CWT (hundredweight), the weight measure common in the onion shipping industry.

Figure 6. Approximate Market Area served by the TVRC



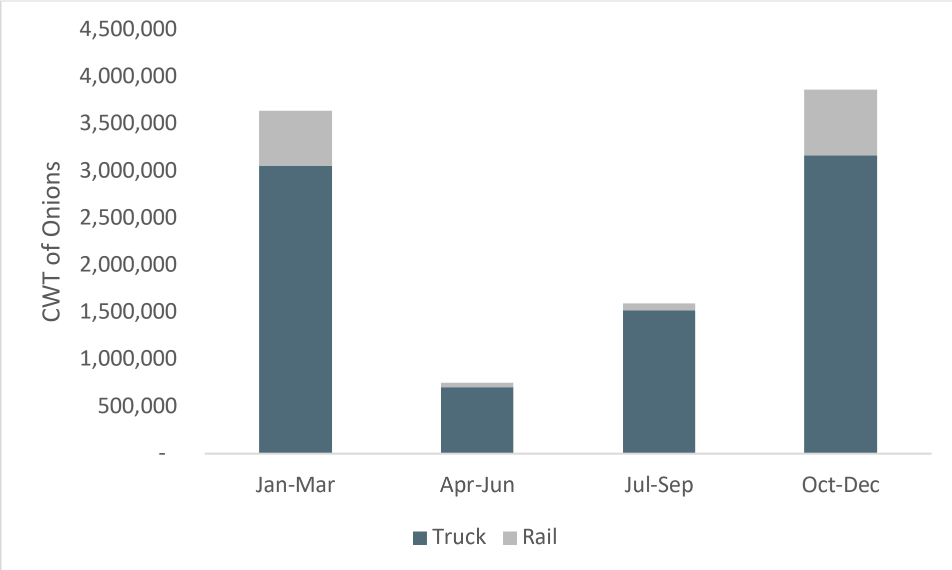
Source: ECONorthwest

Onions are a seasonal commodity, planted in March and April and harvested in late July through late September.[30] Onions are usually dried on the field or in storage and shipped year-round beginning in October.[31] Refrigerated storage and refrigerated shipping allows producers to store and ship onions almost year-round, with the lowest shipping occurring during the spring and summer (Figure 7).

[30] Oregon State University Malheur Experiment Station. *Malheur County Agriculture.* Retrieved from http://www.cropinfo.net/about/malheurCountyAgriculture.php

[31] *Ibid.*

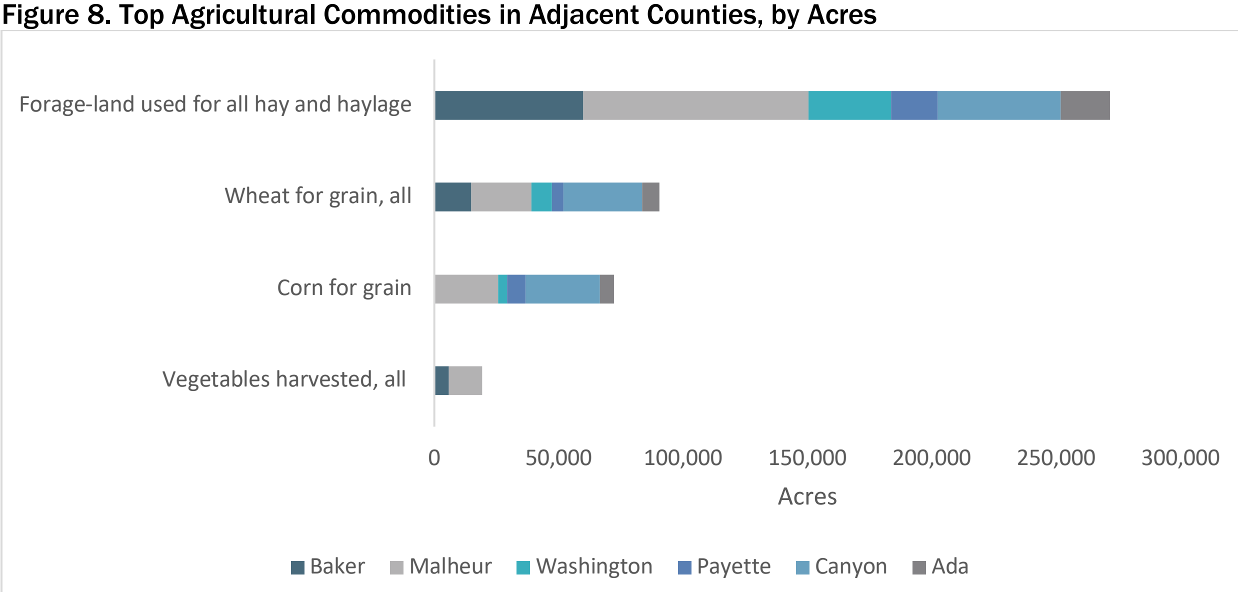
Figure 7. Quarterly Onion Shipments out of the Study Area, 2013-2017



Source: ECONorthwest analysis of USDA Specialty Crop Data

Other agricultural commodities are produced in the region, and dwarf the production of onions, by acres harvested (Figure 8). However, the stakeholder interviews did not indicate that these products would likely pass through the TVRC as currently envisioned. Future expansion and other types of service (including the hay press and loading facility discussed during the stakeholder interviews) may accommodate these other products, however they are not included in this analysis.

Figure 8. Top Agricultural Commodities in Adjacent Counties, by Acres

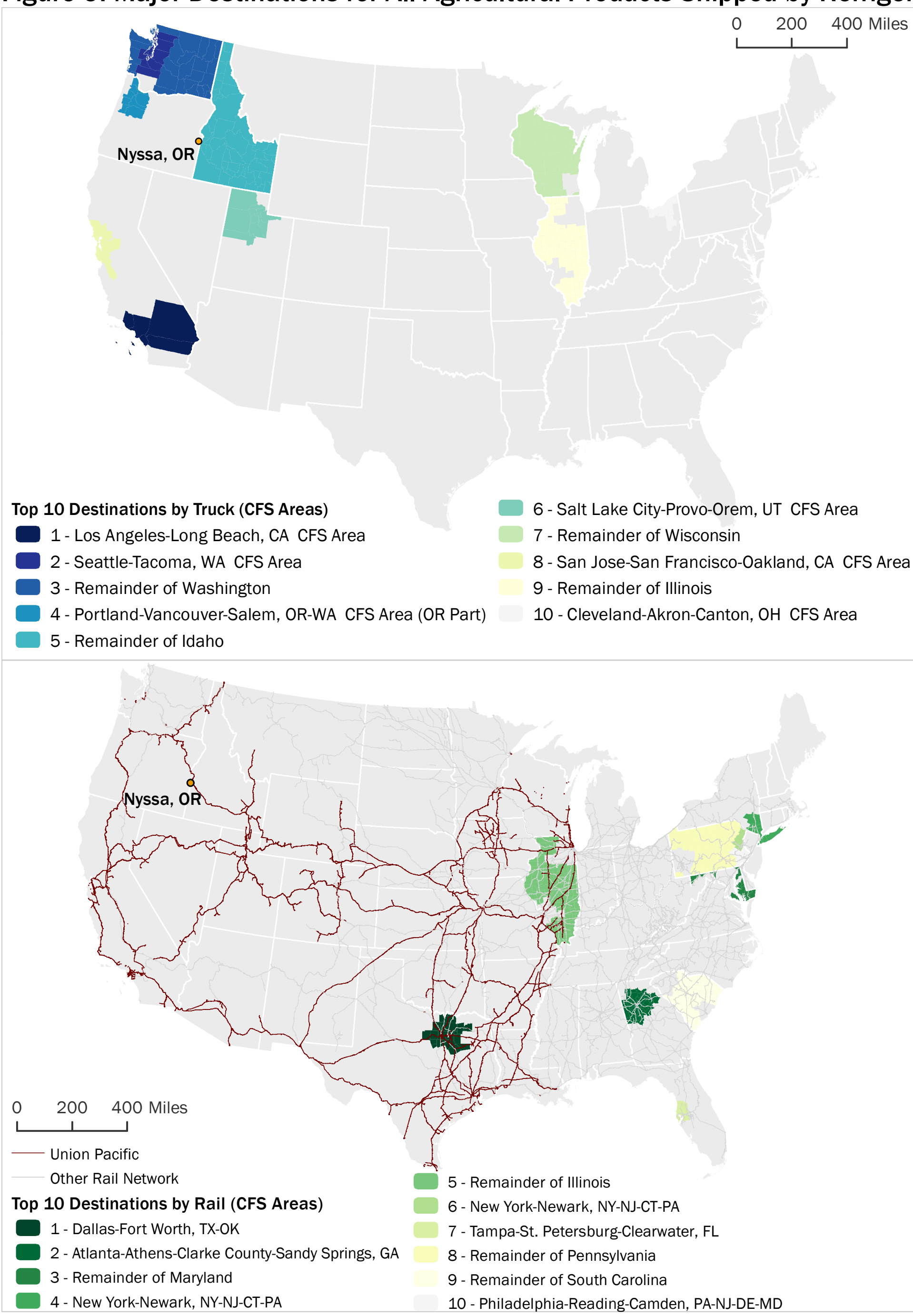


Source: ECONorthwest analysis of 2012 USDA Agricultural Census Data

4.3 Major Destinations

Agricultural products produced in the region are shipped to a broad set of domestic customers, with southern California and the upper Midwest (Illinois and Wisconsin) serving as the primary destinations for truck shipments. Dallas, Atlanta, and the mid-Atlantic (Maryland, Pennsylvania, and New Jersey/New York) serving as primary destinations for rail shipments. Figure 9 shows the major shipping destinations for all agricultural products produced in the region, shipped by refrigerated truck and rail. While these figures represent all agricultural products, the participants of the stakeholder interviews indicated that the onions they ship predominantly move east of Oregon.

Figure 9: Major Destinations for All Agricultural Products Shipped by Refrigerated Truck and Rail



Source: ECONorthwest analysis of Commodity Flow Survey data, All Refrigerated Movements

5 Demand Estimation

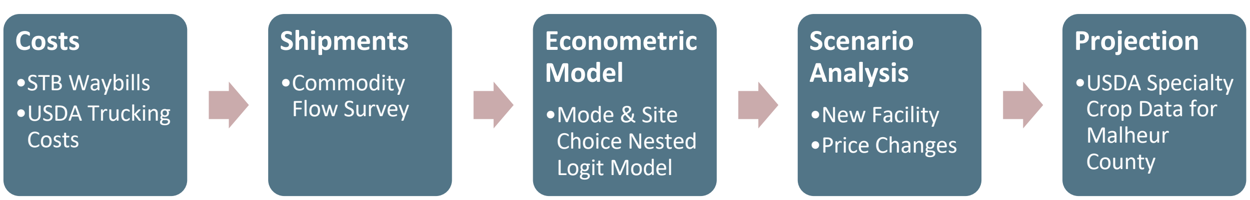
5.1 Conceptual Model

In the Treasure Valley, producers ship their products to a number of different destinations, primarily by truck. Limited options for rail exist (i.e. a limited number of shippers have direct access to a rail siding, while others can truck products to the ColdConnect Facility in Wallula, WA which then travel by train to their final destination), however the proximity and ease of service potentially provided by the TVRC presents a new transportation alternative.

Numerous factors determine the choice between different modes, including time, reliability, volume, destination, and cost. Although the TVRC offers a new method for transporting goods, it is not expected to modify the underlying preference structure for transportation. Additionally, since a number of similar transportation options exist in the region, existing data can be used to predict the likely utilization of the TVRC.

A sequential process utilizing multiple data sources is outlined in Figure 10 below. Shipping costs by both truck and rail are calculated using observed prices from the U.S. Department of Agriculture (USDA) Agricultural Refrigerated Truck Quarterly (AgRTQ)[32] and the Surface Transportation Board Carload Waybill Sample,[33] respectively. These observed costs are used to predict shipping cost for all agricultural products shipped from the region in the United States Census' Commodity Flow Survey.[34] These inputs are then combined in an econometric model that predicts the mode and site-choice decision for all agricultural shipments in the region. The results of this model are then applied to a scenario representing the TVRC to predict the share of shipments traveling by rail. This result is then applied to an estimate of onion production in the region from USDA Specialty Crop data to predict the quantity of agricultural goods passing through the facility.

Figure 10: Conceptual Model Process



Source: ECONorthwest

[32] U.S. Department of Agriculture. 2018. "Agriculture Refrigerated Truck Quarterly." Retrieved from https://www.ams.usda.gov/services/transportation-analysis/agrtq.

[33] Surface Transportation Board. 2018. "Carload Waybill Sample." *Industry Data: Economic Data: Waybill.* Retrieved from https://www.stb.gov/stb/industry/econ_waybill.html

[34] U.S. Department of Transportation, Bureau of Transportation Statistics. 2018. "2012 Commodity Flow Survey." Retrieved from https://www.bts.gov/product/commodity-flow-survey.

Each step utilizes the best available information to construct an estimate of the projected demand for the TVRC. Although the spatial resolution at each step is broader than the Treasure Valley in most cases, the underlying information is transferable to the region. In particular, estimation of latent demand for the TVRC (where none currently exists) necessitates the use of data from outside of the region. Each element is further described in the following sections.

5.2 Costs

The costs to transport agricultural products from the Treasure Valley to areas throughout the United States are subject to fluctuating market conditions. Various factor inputs affect the absolute and relative price of both truck and rail, including the availability of equipment, labor costs, fuel costs, state and federal regulations, etc. A competitive market generally provides trucking services with many players and relatively low barriers to entry. Economic theory suggests that the market price for trucking services will approximately equal the marginal cost of providing those services. Rail services in the region, on the other hand, are provided by one company (and its subsidiaries), providing the opportunity for price-taking behavior, as well as strategically induced artificial scarcity.

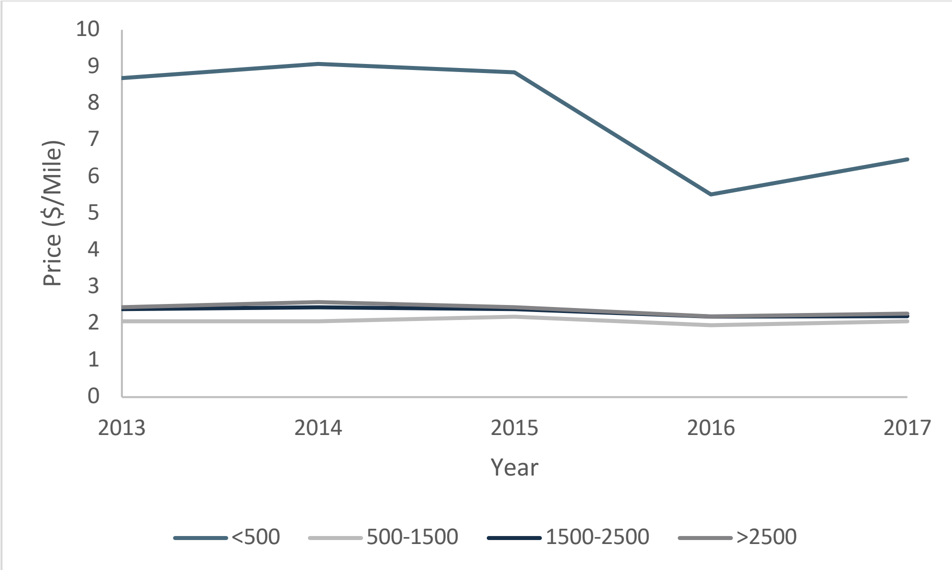
Truck and rail services generally operate as substitutes for transporting agricultural goods throughout the country. There are, however, a number of efficiencies that each mode offers. Rail gains a structural competitive advantage when transporting large volumes over long distances, while trucking services are generally faster and more flexible for small loads, albeit at a higher cost. These market forces are apparent when evaluating predicted marginal per-mile refrigerated transportation prices.

Trucking costs faced by shippers in the study region are derived from the AgRTQ. Quarterly refrigerated trucking rates per-mile are reported by origin and distance bands defined as

- Local: 500 miles and less (e.g. Portland, OR; Seattle, WA),
- Short: between 501 and 1,500 miles (e.g. Oakland, CA; Los Angeles, CA),
- Medium: 1501 and 2,500 miles (e.g. Chicago, IL; Dallas, TX; Atlanta, GA), and
- Long: greater than 2,501 miles (e.g. Newark, NJ; Tampa, FL; Boston, MA).

As indicated in Figure 11 below, rates per mile for the short, medium, and long-distance bands are fairly equivalent at an average of $2.26 per mile and fairly consistent across time, while local distance band rates are roughly four times as high. Local trucking rates experienced a decline in 2016 and 2017 from previous years.

Figure 11. Refrigerated Trucking Prices from the PNW, by Distance Traveled, 2013-2016



Source: ECONorthwest analysis of USDA Refrigerated Truck Quarterly Data

To generate a cost structure for rail, rates were obtained from the most recent complete version (2016) of the Surface Transportation Board Carload Waybill Sample. This dataset is a "stratified sample of carload waybills for all United States rail traffic submitted by those rail carriers terminating 4,500 or more revenue carloads annually."[35] The unrestricted public-use version of this dataset partially obscures geographic information to make it impossible to trace individual observations back to shippers. To best represent the market prices faced by shippers in the region, observations were restricted to refrigerated rail cars (STB car type "44") with origins in the Pacific Northwest (i.e. WA, OR, and ID) and any domestic destinations in the continental United States. This resulted in 547 observations, each with an individual sampling weight, ultimately representing 14,104 shipments. Summary statistics are presented in Figure 12 below.

Figure 12: Carload Waybill Dataset, Summary Statistics, 2013-2017

Variable	Mean	Std. Dev.	Min	Max
Miles	1968	759	30	3440
Tons	68	17	4	100
Freight Charge	$11,969	$5,066	$875	$29,995
Rate/Mile	$9.66	$12.81	$0.41	$70.70
Rate/Ton	$197	$191	$18	$2,927

Source: ECONorthwest analysis of STB Carload Waybill Sample, 2013-2017

To predict price to ship by rail for each origin-destination pair in the region, a truncated linear regression model is applied to the public waybill sample. The general specification is

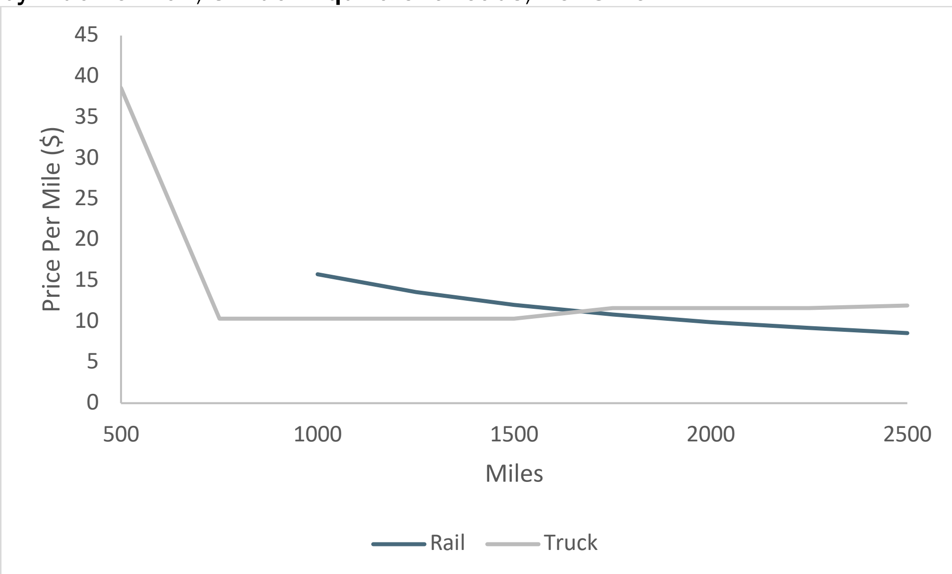
$$E[Rate_{Mode}|Rate_{Mode} > 0] = (\ln(Miles), \ln(Tons), Quarter)'\beta_i + \varepsilon,$$

[35] Surface Transportation Board. 2018. "Carload Waybill Sample." *Industry Data: Economic Data: Waybill.* Retrieved from https://www.stb.gov/stb/industry/econ_waybill.html

where ε is distributed normally.

The relative average price per mile between truck and rail is a function of distance and volume, with higher volumes and longer distances resulting in lower average rail pricing. A comparison of the shipping costs for a load equal to five trucks is presented in Figure 13 below. The point at which the average per-mile rail price drops below the trucking price occurs for shipments between 1,500 and 1,750 miles.

Figure 13. Refrigerated Transportation Prices from the Pacific Northwest, by Truck or Rail, 5-Truck Equivalent Loads, 2013-2017



Source: ECONorthwest analysis of STB Carload Waybill Sample, 2013-2017

This point occurs at a shorter distance for larger loads (i.e. less than 1,000 miles for 10 truck equivalent loads), and at a further distance for smaller loads (i.e. more than 2,000 miles for four-truck equivalent loads). According to this cost structure, it is never cost effective to ship by rail from the study area for less than four-truck equivalent loads, indicating the significant market and customer consolidation is necessary for cost-effective utilization.

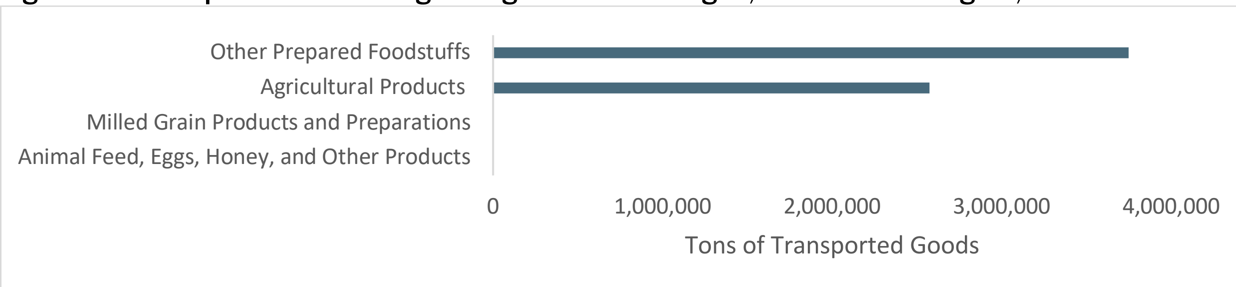
5.3 Shipments

The United States Census conducts the Commodity Flow Survey[36] every five years to measure how products move through, in, and out of the United States. Since this data is a stratified random sample, it can be used to represent the mode and destination choice decision for shippers in the eastern Oregon. It is a broad dataset with a large number of regions, products, and shipping modes. A number of steps are taken to filter the observations down to a set of goods that most closely mirrors those being shipped in the study area. These parameters were chosen to be inclusive of all potential users of the TVRC, as well as competing users of

[36] U.S. Census Bureau. "2012 Data." *Commodity Flow Survey.* Retrieved July 26, 2018, from https://www.census.gov/econ/cfs/

refrigerated trucks and rail cars. The universe of goods in the 2012 survey[37] was restricted to non-hazmat agricultural goods traveling in temperature-controlled trucks or rail cars, and originating in eastern Oregon, eastern Washington, or Idaho. This results in 5,418 observations, primarily agricultural and "prepared foodstuff" products, summarized in Figure 14 below.

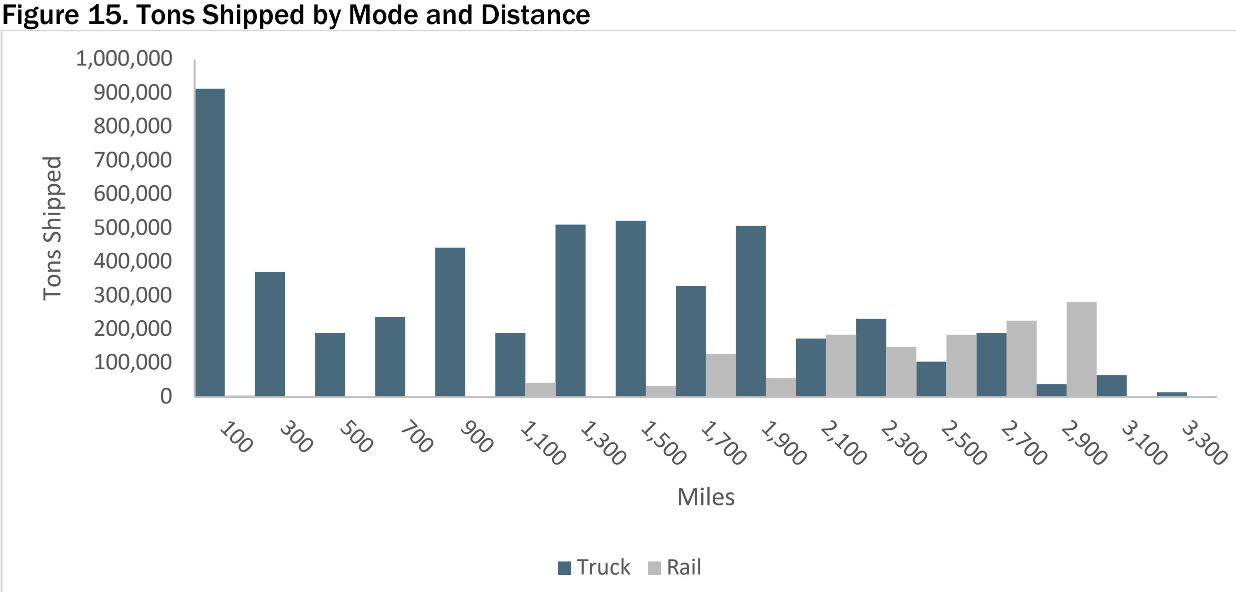
Figure 14: Transported Goods Originating in Eastern Oregon, Eastern Washington, and Idaho



Source: ECONorthwest analysis of 2012 Commodity Flow Survey Data

These products were shipped by a mix of rail and truck across a wide distance band. Although approximately 80 percent of goods travel by truck, a greater share travel by rail for the long-distance transits. Figure 15 summarizes the distribution of tons shipped by mode and distance.

Figure 15. Tons Shipped by Mode and Distance



Source: ECONorthwest analysis of 2012 Commodity Flow Survey Data

5.4 Econometric Model

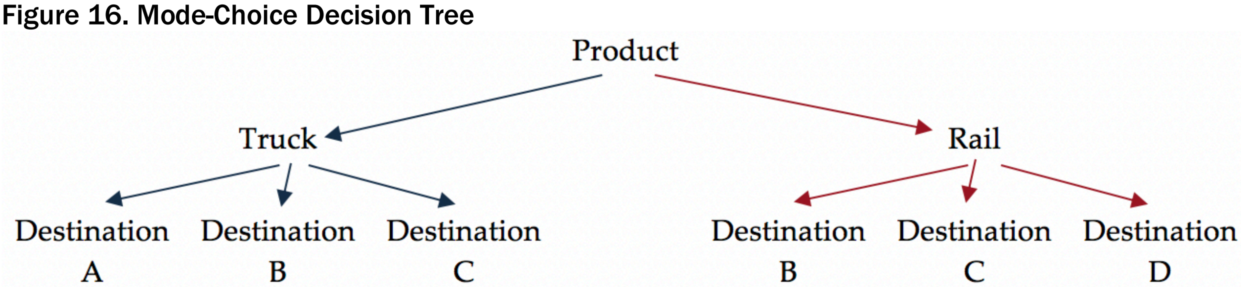
The literature review and stakeholder interviews both revealed numerous factors that determine the mode selected to ship goods, with price, availability of rail cars, transit time, and customer location indicated most frequently. The evaluation of shipping prices found that rates are widely variable, particularly concerning mode, weight, and distance. Due to this wide variety of factors, along with an additional likely set of unobservable effects, a simple

[37] Results from the 2017 survey were not yet available.

minimum-cost financial model is not sufficient to predict demand for the services provided by the TVRC. Instead, a full representation of the choice structure is necessary.

A nested-logit model is used to jointly evaluate a shipper's mode and site-choice decision. This approach incorporates the set of decisions outlined in Figure 16 below. Black arrows on the left represent the current mode and destination alternatives, and the TVRC is represented by the set of red arrows on the right. A shipper jointly selects the mode (i.e., Truck or Rail) and the destination (A, B, or C). Each mode may provide access to a different set of destination, with truck able to serve a broader set of destination, and rail more likely to serve some destinations that are further away and have direct rail access. A set of independent variables can be incorporated at each nesting level to describe the motivators of both mode and site choice. This entire choice structure can then be applied to the TVRC to predict the share of products that will get shipped by rail. This type of discrete choice model uses attributes of the decision process to predict the probabilities of each of the limited number of available choices made. In this context, these choice probabilities can be interpreted as mode shares.

Figure 16. Mode-Choice Decision Tree



Source: ECONorthwest

The nested logit model is particularly attractive for this application because it allows for a rich set of possible substitution patterns. The model assumes that a given shipper, *i*, receives economic profit[38] π from shipping their product to a given destination, *j*, via mode B_k.[39] This takes the functional form:

$$\pi_{ij} = V_{ij} + \varepsilon_{ij},$$

where V_{ij} is a set of observable variables while ε_{ij} is unobservable and assumed to have a cumulative distribution:

$$exp\left(-\sum_{k=1}^{K}\left(\sum_{j\in B_k} e^{-\varepsilon_{ij}/\lambda_k}\right)^{\lambda_k}\right).$$

---

[38] These types of models are derived from basic utility theory. The term "profit" is used here interchangeably with the more commonly applied "utility."

[39] A more complete description of the model is available in Train, K. 2003. *Discrete Choice Models with Simulation*. Cambridge University Press.

The parameter λ_k is a measure of the degree of independence among the variables within a nest. The probability of shipper i choosing destination j via mode k can now be calculated as:

$$P_{ij} = \frac{e^{V_{ij}/\lambda_k}\left(\sum_{j \in B_k} e^{V_{ij}/\lambda_k}\right)^{\lambda_k - 1}}{\sum_{k=1}^{K}\left(\sum_{j \in B_k} e^{V_{ij}/\lambda_k}\right)^{\lambda_k}}.$$

This model is applied to CFS data, and the quarterly rail and trucking price functions developed earlier in Section 5.2.

Distance and value per ton exhibit characteristics of a log-normal distribution, with a cluster of values at the relatively low end of the spectrum and a small number of very large values at the high end. These variables are logged in the specification, and state fixed effects are used to represent unobservable variation in shipping characteristics between Washington and Oregon. Results are displayed in Figure 17 below. All coefficients are strongly statistically significant, with price taking an expected negative sign (indicating that destinations that are more expensive to ship to are selected less often). At the mode-choice nest, the log of distance has a positive coefficient, while the log of value per ton has a negative coefficient, indicating that lower-value products that are traveling further are more likely to be shipped by rail.

Figure 17. Nested Logit Model Results

		Coefficient	Standard Error	[95% Confidence	Interval]
Site Choice Nest					
	Price	-0.0013	0.0000	-0.0013	-0.0013
Mode Choice Nest					
Truck	(base)				
Rail					
	Ln Distance	1.02	0.01	1.00	1.05
	Ln Value Per Ton	-0.89	0.01	-0.91	-0.86
	State Fixed Effects				
	Idaho	-1.88	0.05	-1.98	-1.78
	Washington	-1.77	0.05	-1.86	-1.67
	Oregon (base)	-	-	-	-
Dissimilarity Parameters					
	/truck_tau	0.40	0.01	0.39	0.41
	/rail_tau	1.40	0.01	1.27	1.52
Log likelihood		-3,009,211			
Wald chi2(5)		45,123			

Source: ECONorthwest

To ensure an appropriate representation of the mode-choice decision, a number of specifications were tested; ultimately a parsimonious model was used to avoid researcher-induced variable selection bias.

5.5 Scenario Analysis

The econometric model serves as a representation of the existing origin-mode-destination decision structure for shippers competing in the same market as those in eastern Oregon. Construction of the TVRC will introduce a new mode alternative with an equivalent set of unobservable attributes (e.g., timeliness and reliability) as the existing rail alternative, albeit with a different overall cost function. Thus, to predict the amount of goods shipped by rail from the TVRC, the cost function in the existing model is modified to represent the new facility. In particular, the price of rail is reduced by the marginal cost to ship goods 235 miles by truck from Nyssa to the existing ColdConnect facility in Wallula, Washington and increased by the marginal cost to ship goods by rail over that equivalent distance. When applied to the CFS data used in the nested logit model, shippers observe an average price decrease of $326 (30 percent decline) for all rail-mode origin-destination pairs. This results in the econometric model predicting that approximately a quarter of goods will travel by rail, with significant seasonal variation.

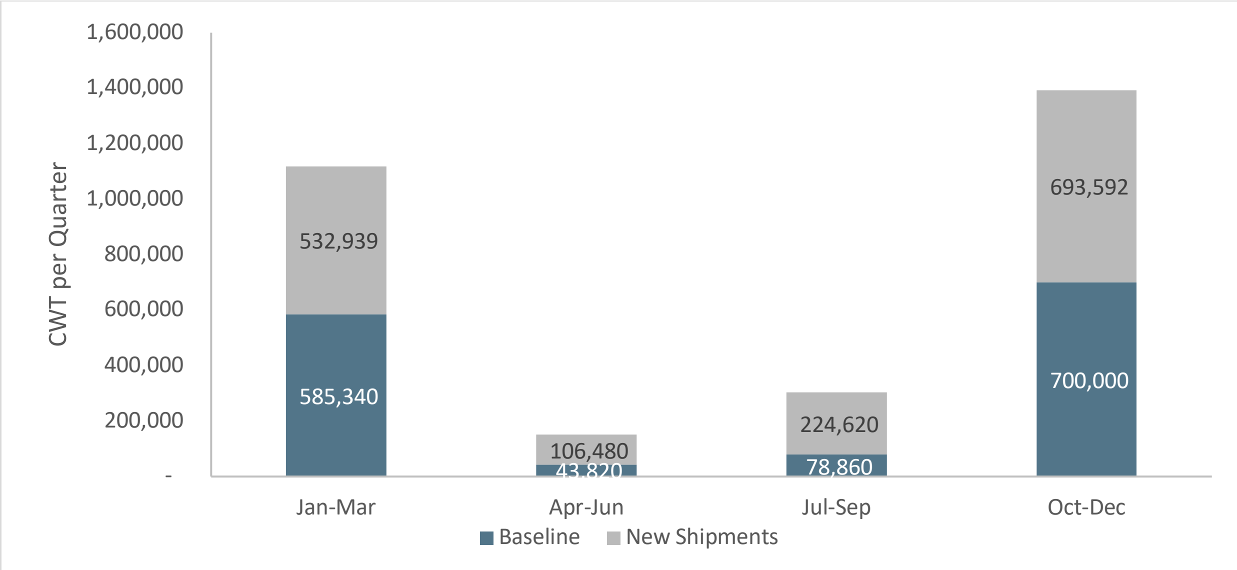
5.6 Projection

The econometric model represents the set of preferences for transportation services in the region. This model is then applied to an estimate of the number of onions shipped out of the Malheur County, OR and adjacent areas in Idaho, calculated using USDA Specialty Crop production data.

There are two estimated sources of products that may pass through the facility: 1) products that currently travel out of the study area by truck, and 2) products that currently travel out of the study area using existing rail sidings and infrastructure in the region. The former can be thought of as “new” shipments, while the latter is a baseline estimate of rail use in the region. It is unclear whether the existing baseline shipments will shift from existing rail infrastructure and use the TVRC. For the purposes of this analysis, it is assumed that the facility will capture all rail shipments of onions out of the region.

When applied to USDA Specialty Crop production data, the econometric model predicts that nearly 3 million CWT of onions will utilize the facility, with significant seasonal variation as illustrated in Figure 18 below. Approximately 79 percent of the shipments will take place between October and March. The estimate is predicated on the assumption that the facility operates efficiently, is priced at market rates, and provides a level of service equivalent to that currently available throughout the region.

Figure 18. Projected Quarterly Shipments from the TVRC, CWT



Source: ECONorthwest

Rail cars vary in size, and depending on loading technique, can carry different volumes. Quarterly shipments in CWT, 1,200 CWT capacity rail cars, and 1,600 capacity rail cars are shown in Figure 19 below. This amounts to 86-107 thousand CWT per week, and depending on the size of the rail car, anywhere between 54-89 rail cars per week in the high season.

Figure 19. Projected Quarterly Shipments out of the Treasure Valley Reload Center

Quarter	Shipments (CWT)	Rail Cars (1,200 CWT)	Rail Cars (1,600 CWT)
Jan-Mar	1,118,000	932	699
Apr-Jun	150,000	125	94
Jul-Sep	303,000	253	189
Oct-Dec	1,394,000	1,162	871

Source: ECONorthwest

5.7 Exogenous Factors that May Affect Demand

The validity of these projections is conditional on the facility operating in a manner that provides a level of service equivalent to existing rail services in the region. Aside from this operating assumption, there are a number of exogenous factors that may affect these projections. Changes in commodity value, trucking prices, and production volumes may influence shipper mode choice, and ultimately, the volume of commodities passing through the facility.

Commodity Value Fluctuations

The relative value of commodities affects the relatively likelihood of a shipper choosing rail or truck to move their products. As seen in the nested logit model results in Figure 17 on page 42 above, lower value products are more likely to move by rail. Goods that have a higher time value are more likely to move by truck. As the relative price of onions increases or decreases, respective mode choice is expected to change as well.

Trucking Price Changes

The stakeholder interviews indicated that the price of the facility must be competitive with other transportation options for it to be utilized. This price of available substitute services provided by the facility has a strong likelihood of either increasing or decreasing utilization. As described in Section 2.1 on page 17, there are a number of factors contributing to changing trucking prices, including restrictions on hours of service, a decrease in the number of available truck drives, and parking shortages. Other factors, such as changes in fuel costs may also influence the relative price of trucking.

Production Volumes

Agricultural production is highly variable and is a function of both pre-season crop acreage allocations, as well as environmental conditions including temperature, rainfall, and solar intensity. Shifts in acreage from other crops to onions, increased rainfall during the summer, or a longer growing season may increase crop yields and resulting demand for the TVRC.

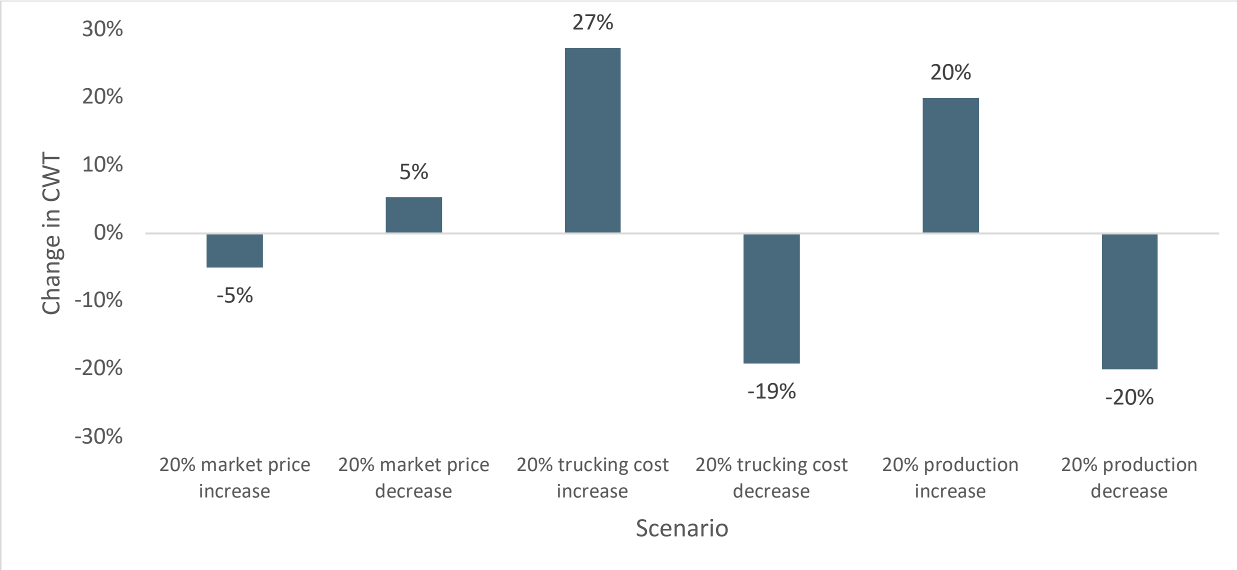
5.7.1 Sensitivity Analysis

While explicit quantification of these exogenous factors is difficult to perform with certainty, it is possible to evaluate the magnitude that each of these changes may have on the volume of agricultural products passing through the TVRC. Each of the above listed effects may operate independently or jointly, and of a currently unknown magnitude. In order to test the implications of a number of difference changes in macroeconomic conditions, a generic set of value, price, and production changes are analyzed. Six potential stylized scenarios are evaluated to test the sensitivity of the econometric model to exogenous effects. Each is listed below, along with an example of a potential cause of such a change:

1. A 20 percent increase in the market price of shipped commodities (example: decline in production in other regions)
2. A 20 percent decrease in the market price of shipped commodities (example: decline in demand for onions)
3. A 20 percent increase in truck transportation costs (example: decrease in the number of available truck drivers)
4. A 20 percent decrease in truck transportation costs (example: decrease in fuel costs)
5. A 20 percent increase in production (example: shift in acreage from other uses to onions)
6. A 20 percent decrease in production (example: drought)

Each scenario is designed to capture the net effect of many different exogenous factors and is evaluated independently. The results are displayed in Figure 20 below.

Figure 20. Sensitivity Analysis of Projected Shipments from the TVRC



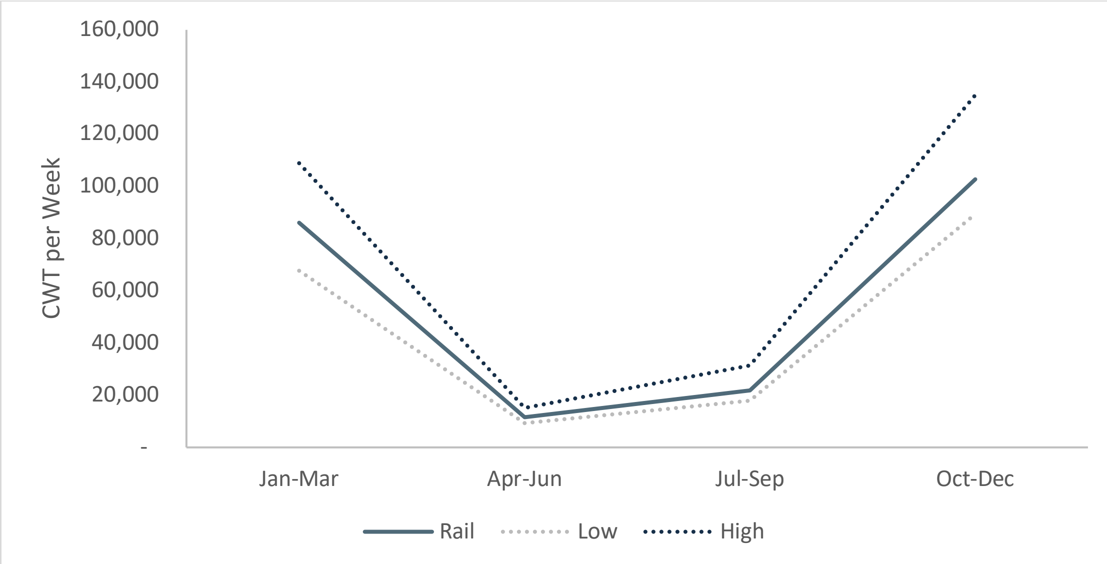
Source: ECONorthwest

The first two scenarios evaluating a change in the market price of goods have a converse effect on the volume shipped from the facility. An increase in the market price of the products being shipped will lead to a larger share of the products being shipped by truck, with the timeliness and reliability of trucking outweighing it's potentially increased price.

The second two scenarios evaluating a change in trucking prices have a dramatic positive effect on the use of the facility. A 20 percent increase in trucking costs will lead to a 27 percent increase in the volume of product traveling by rail, while a 20 percent decrease in trucking costs will lead to a 19 percent decrease.

The final two scenarios have a direct one-to-one effect on the volume shipped from the facility. Assuming that a change in production does not affect market prices or trucking costs, the allocation of product between truck and rail will not change. The change in the volume passing through the facility will mirror the change in production.

Figure 21. Projected Weekly Shipments from the TVRC, Scenario Analysis



Source: ECONorthwest

Each of these scenarios impact the quarterly projections of the econometric model. Figure 21 above shows the estimated weekly CWT shipped, with the highest and lowest scenarios plotted alongside. This projection estimates a wide range of potential use of the facility depending on seasonal and exogenous effects, with 67 to 135 thousand CWT shipped from the facility per week in the peak season, and 9 to 31 thousand CWT shipped per week in the low season.

6 Capital and Operating Cost Analysis

Using the demand estimates and sensitivity analyses from prior sections, this section evaluates the TVRC operating and capital costs to assess financial feasibility and sustainability over a five year period. Also include is a description of the site, basic site design and configuration drawings, and a description of how the faciltiy will operate.

6.1 Site Location and Configuration

The site is situated along the Union Pacific railroad line just north of Nyssa, Oregon. Goods are expected to be loaded onto trains that travel back down this Union Pacific line through Nyssa and onwards to the east. Capturing Union Pacific service at a facility in Nyssa would provide a significant advantage to Treasure Valley shippers who do not currently have rail access or enough rail service at their local rail spurs. The site's location could meaningfully increase the marketability of Treasure Valley products, potentially opening up new destinations for some producers.

The facility will include a large warehouse with the rail line on one side and loading docks on the other side. Local shippers will back their trucks into the loading docks and unload their product into the warehouse. From the warehouse, product will be reloaded on to rail cars when the train arrives. The main warehouse with loading docks will require product to be stored temporarily. The site has potential for additional warehouses if products need to be stored for longer.

The rail components of the TVRC will consist of a support track with 7,000-foot minimum clearance from the Union Pacific mainline. Two additional support tracks will be available to set out inbound cars and pull out with outbound cars. There will be sufficient switching length to shove a full cut of cars onto either loading tracks. There are sufficient track centers planned to allow for additional expansion[40] in the future for two support tracks with 7,000-foot clearance each, two more storage tracks, and two more working tracks. These additional support tracks and storage tracks would support any industrial customers that develop in the future industrial park adjacent to this facility on the Malheur County property.

6.2 Capital Costs

The capital to purchase and construct the faciltiy will be provided by the Oregon Department of Transportation's Keep Oregon Moving funds, as allocated by House Bill 2017. These funds are only available for capital costs, and will not be used for operating costs. The funds will be used to purchase the site land; prepare it for construction; construct the rail lines, switches, and infrastructure; construct the office; pave and stripe the parking lot; and purchase equipment

[40] This analysis only includes planned construction funded by the State of Oregon in phase 1.

and machinery. The funds also will cover "soft construction costs," including architecture, engineering, legal, and accounting. Figure 22 lists the estimated capital costs.

Figure 22. Estimated Capital Costs for Constructing the TVRC

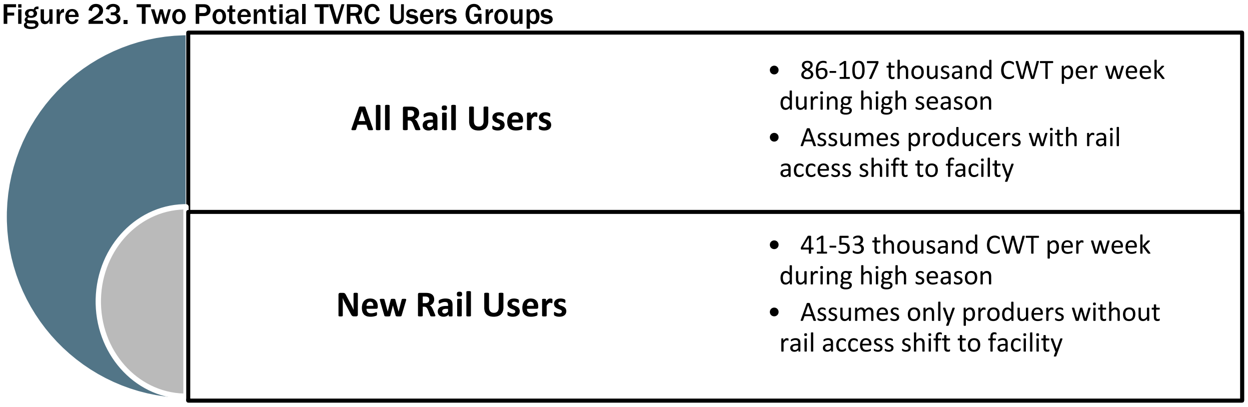
Cost Category	Estimate
Land Acquisition	$1,600,000
Design Engineering	$1,196,000
Permitting/Management/Miscellaneous	$455,000
Site Roadways, Layout, Parking, Utilities, Stormwater, Wetland Mitigation	$4,380,000
Reload Building	$6,758,000
Rail Improvements	$10,020,000
Water Extension from City of Nyssa	$1,283,000
Exterior Road Improvements	$308,000
Total Estimated Project Cost	$26,000,000

Source: Malheur County Development Corporation

6.3 Operating Model

As the demand estimates in Section 5.6 on page 43 show, there are two levels of potential use of the facility. Either all producers, including those that currently have rail access, shift to the facility, or only those producers who currently do not have rail access will shift to the facility. Figure 23 below demonstrates these groups. This analysis is performed on the assumption that all onion rail shipments in the Treasure Valley will pass through this facility.

Figure 23. Two Potential TVRC Users Groups



Data is sourced from the Bureau of Labor Statistics, internet research, interviews with experts, and from the proposed operations manager of the facility who manages a similar reload facility in Boardman, Oregon. The following assumptions are employed across a five-year time frame and three-year build-out:

- The facility operates five days a week.
- Shifts are eight hours long.
- Overtime shifts are four hours.
- Each quarter has 13 weeks.
- Once operating at estimated demand, CWT shipped does not increase nor decrease.
- Fixed and labor costs appreciate at 3 percent per year.

- No allowances for increased fees are included.
- Depreciation of equipment is modeled on a straight-line 20-year basis.

6.3.1 Five Year Horizon and Three-Year Build-Out

The operating proforma evaluates the facility over a five-year time period. However, it assumes that it would take three years to become fully built out and operational. This assumption was vetted by interviewees and industry experts. The model estimates the facility would capture 50 percent of expected utilization in year one, 80 percent in year two, and 100 percent in years 3-5. Total CWT loaded (revenues) and variable costs are adjusted by this build-out schedule. Most fixed costs are not adjusted by this build-out schedule, with the exception of full-time operator staff, forklifts, and forklift batteries. Detailed below, the model assumes a minimum number of full-time staff would be needed to operate the facility year-round, and scales this according to the build out schedule. Because the facility has full fixed costs and lower revenues, the facility is less profitable in years one and two.

6.3.2 Revenues

Operating a relatively simple model, the reload facility would charge a handling fee for each CWT loaded. Industry research and conversations with other facility managers suggests that a handling fee of $0.7175 per CWT is in line with the market.

In addition, the site has the potential to warehouse product, but this is not included in the phase one design and is not included in the model in years one through five. Total quarterly shipments and annual revenues from the facility services in are listed in Figure 24 and Figure 25 below, including the three year build out schedule.

Figure 24. Projected Quarterly Shipments, CWT*

Quarter	Year 1 (50 percent)	Year 2 (80 percent)	Year 3 (100 percent)	Year 4 (100 percent)	Year 5 (100 percent)
Q1	559,491	895,185	1,118,981	1,118,981	1,118,981
Q2	75,412	120,659	150,824	150,824	150,824
Q3	151,933	243,093	303,866	303,866	303,866
Q4	697,007	1,115,210	1,394,013	1,394,013	1,394,013

Source: ECONorthwest
Note: *The model assumes a three-year build out and that year one and two are operating at 50 and 80 percent of capacity, respectively.

Figure 25. Facility Build Out and Project Annual Revenues

Year	Build Out	Annual Revenues
Year 1	50%	$1,064,657
Year 2	80%	$1,703,451
Year 3	100%	$2,129,313
Year 4	100%	$2,129,313
Year 5	100%	$2,129,313

Source: ECONorthwest

6.3.3 Operating Costs

The facility has numerous fixed and variable operating costs which are outlined in Figure 26 below. As the utilization of the facility would vary seasonally, it is assumed that the facility would have a full-time staff sufficient to operate the facility during the low season and that additional staff would be hired during the high season. Property taxes are omitted due to the non-profit status of the TVRC owner/operator.

Figure 26: Fixed and Variable Operating Costs for the TVRC

Fixed Costs	Cost Assumption	Unit	Source & Notes
Utilities	$28,800	Per Year	Similar Facility Operating Costs
Property Maintenance	$10,000	Per Year	Similar Facility Operating Costs
Property Insurance	$12,000	Per Year	Similar Facility Operating Costs
Security Cameras (25)	$500	Each	Similar Facility Operating Costs
Forklifts (14)	$25,000	Each	Industry Research *Purchase seven in Y1Q1 *Purchase five at 3% inflation in Y2Q1 *Purchase two at 3% inflation in Y3Q1
Batteries (28)	$5,000	Each	Industry Research *Purchase 14 in Y1Q1 *Purchase 10 at 3% inflation in Y2Q1 *Purchase four at 3% inflation in Y3Q1
Manager Salary (1)	$67,390	Per Year	Bureau of Labor Statistics
Admin Salaries (1.5)	$115,000	Per Year	Similar Facility Operating Costs
FT Operator Wages (7)	$16	Per Hour	Industry Research (labor costs increase 3% per year)
Taxes and Benefits	30% of payroll	Per Year	Bureau of Labor Statistics
Variable Costs	**Cost Assumption**	**Unit**	**Source & Notes**
Operator Overtime Wages	$24	Per Hour	Industry Research
Seasonal Staff Wages	$24	Per Hour	Industry Research
Additional Taxes and Benefits	30% of payroll	Per Year	Bureau of Labor Statistics

Source: ECONorthwest

Staffing

The model assumes one full-time manager would oversee all business lines, carry out day-to-day operations, handle logistics with the rail lines, and coordinate with the local agriculture producers. An additional 1.5 FTE are expected as administrative staff. Industry research from staff costs at a similar facility and Bureau of Labor Statistics estimates are used to determine salary[41] and benefits.[42]

For full time operating staff, shifts are assumed to be eight hours. Adjusted to full-time-equivalents, the facility would require approximately seven full time staff to fully operate, plus one facility manager during the low season. These staff levels were estimated from operating data supplied by a comparable facility at the Port of Morrow, Oregon. During the high season, an additional 13 to 19 seasonal (non-overtime) staff will be needed to satisfy demand. The projected seasonal staffing needs are listed in Figure 27 below.

Figure 27. Projected Seasonal Staffing Needs

Quarter	CWT Per Quarter	CWT Per Day	Labor Hours Needed per Day	FT Staff Hours per Day	Overtime Hours Per Day	Seasonal Hours Needed per Day
		5 Days/ Week	12 (3 people * 4 hours)	FT Staff * 8 hours/day	FT Staff * 4 hours/day[1]	Remainder
Q1	1,118,981	17,215	186	56	28	102
Q2	150,824	2,320	25	56	0	0
Q3	303,866	4,675	51	56	0	0
Q4	1,394,013	21,446	232	56	28	148

Source: ECONorthwest with inputs from interviewees and industry managers
[1]Overtime shifts could occur on weekends, but are assumed part of the regular day for simplicity

Using the staffing estimates for each quarter, Figure 28 describes total operating staff costs (excluding management and administrative staff) at the hourly rates given. Taxes and benefits are assumed for all full time and seasonal staff and are assumed to be 30 percent of costs.[43]

Figure 28. Projected Quarterly Operating Staff Costs

Quarter	CWT per Quarter	FT Staff Costs	Overtime Costs	Seasonal Costs	Total Staff Costs
		$16.00/hr	$24.00/hr	$24.00/hr	Quarterly
Q1	1,118,981	$58,240	$43,680	$159,552	$261,472
Q2	150,824	$58,240	$0	$0	$58,240
Q3	303,866	$58,240	$0	$0	$58,240
Q4	1,394,013	$58,240	$43,680	$230,976	$332,896

Source: ECONorthwest with inputs from interviewees and industry managers
[1]Overtime shifts could occur on weekends, but are assumed part of the regular day for simplicity

[41] Bureau of Labor Statistics. 2018. "Transportation, Storage, and Distribution Managers (113071) salary for Eastern Oregon Nonmetropolitan Area." Retrieved from https://data.bls.gov/oes/#/home

[42] Bureau of Labor Statistics. 2018. "Employer Costs for Employee Compensation for the Regions: Employer costs per hour worked for employee compensation and costs as a percent of total compensation: Private industry workers, by census region and division." Pacific West Division. Retrieved from https://www.bls.gov/regions/southwest/news-release/employercostsforemployeecompensation_regions.htm

[43] *Ibid.*

Total Operating Costs

Figure 29 below demonstrates total operating costs for the five-year time period. Fixed costs increase in years one through three as capital equipment is acquired, then increase in years four and five due to a 3 percent annual increase built into the model. No equipment purchases are modeled in years four and five since the facility has built out capacity and bought all the necessary equipment. Variable costs increase during the build out through year three, then increase 3 percent in years four and five.

Figure 29. Annual Operating Expenses Over Phased Build Out

Year	Build Out	Operating Expenses
Year 1	50 percent	$1,007,458
Year 2	80 percent	$1,249,398
Year 3	100 percent	$1,382,615
Year 4	100 percent	$1,342,139
Year 5	100 percent	$1,382,403

Source: ECONorthwest

6.4 Financial Feasibility

The results of the operating model determine that the reload facility will likely be financially sustainable over the five years evaluated. Because the facility is ramping up production but has fully loaded fixed costs in years one and two, it is less profitable. Figure 30 below details the operating revenues, expenses, and net income of the TVRC at projected levels of demand.

Figure 30. Financial Feasibility of the TVRC

Year	1	2	3	4	5
Build out	50 percent	80 percent	100 percent	100 percent	100 percent
Revenues	$1,064,657	$1,703,451	$2,129,313	$2,129,313	$2,129,313
Expenses	$1,007,458	$1,249,398	$1,382,615	$1,342,139	$1,382,403
Depreciation	$24,500	$24,500	$24,500	$24,500	$24,500
Net Income	$32,698	$429,553	$772,198	$762,674	$722,410

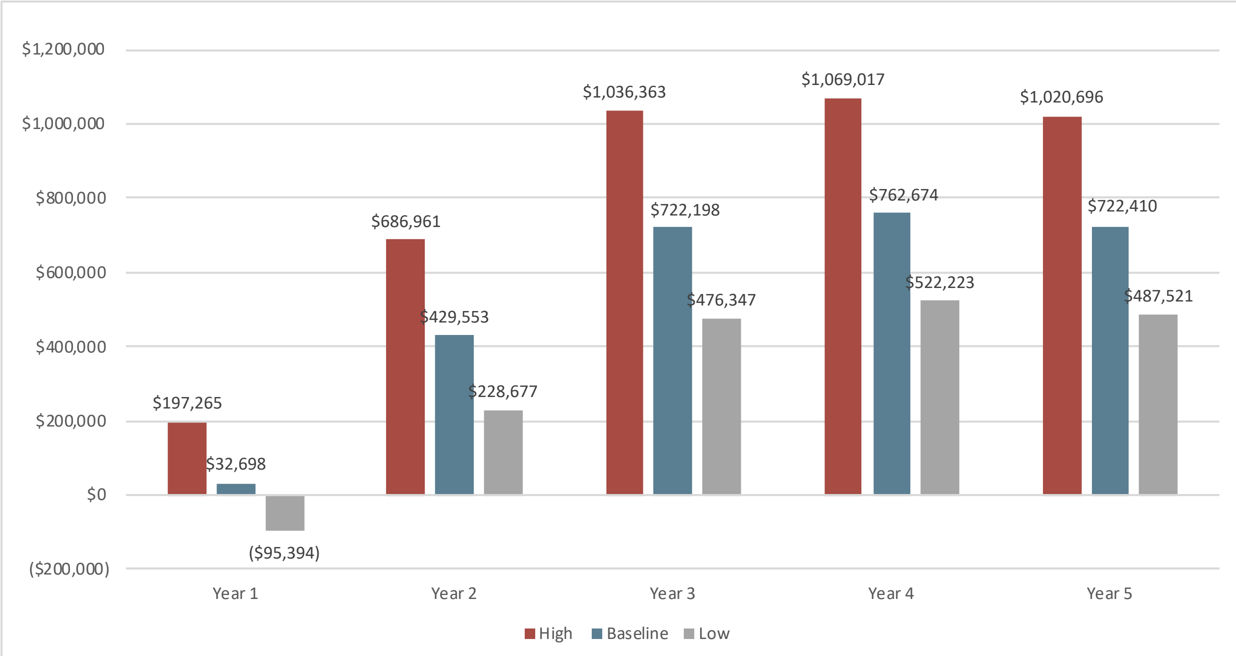
Source: ECONorthwest

6.4.1 Financial Sensitivity Analysis

The model allows financial sensitivity testing for different levels of demand. Using the high and low demand estimates from the sensitivity analysis in Section 5.7.1 (page 45), the model shows the financial outcomes if production volumes, gas prices, or market prices for the goods transported increase or decrease. The estimates in Figure 30 are the baseline.

As Figure 31 shows, the model assumes the TVRC would see positive net income in each demand state except year one in the low-demand state, when it would operate at a loss.

Figure 31. Financial Sensitivity Analysis, Proposed Treasure Valley Reload Facility



Source: ECONorthwest

6.4.2 Breakeven Analysis

The model also allows for a breakeven analysis to determine the price the facility needs to charge for the reloading services to break even. Looking at the five-year cumulative net income, the facility would need to charge a minimum of $0.51 per CWT to break even.

In a low demand state, this price would need to be $0.56 per CTW, and in a high-demand state, this price would need to be $0.47 per CWT.

7 Economic Impact Analysis

The TVRC will generate positive economic impacts by increasing local jobs, incomes, and output. Any increase in economic activity in the study area has the potential to filter through the economy and create downstream benefits in the region. This Section presents the results of an economic impact analysis of the TVRC and estimates how the number of jobs, profits of certain industries, and government tax revenues might change.

Economic impacts are best calculated as marginal impacts that occur as a result of one or more scenarios. For the purposes of this analysis, the baseline scenario is considered to be the status quo state of the world, in which agricultural products are shipped either from private rail sidings in the Treasure Valley, the ColdConnect Facility in Wallula, Washington, or by truck to destinations throughout the contiguous United States. The alternative scenario includes the construction of the TVRC that will operate at levels outlined in other sections of this report. Although the TVRC will result in shippers reducing their reliance on other shipping alternatives in the baseline scenario, no estimate in the decline in jobs or revenue to existing rail facilities or the trucking industry is included. Furthermore, the opportunity cost of the State of Oregon's contribution to the facility is also not included. In particular, this analysis does not evaluate the source of funding and the implications of that wealth transfer in the economy. To this extent, the estimate produced can be considered an estimate of the gross economic contribution of the facility as opposed to a net analysis.

Economic impacts must also be calculated within a defined geography. The gross effects of the TVRC's economic activity are quantified for the Oregon portion of the primary study area, specifically Baker, Harney, and Malheur Counties. Additional economic impacts may occur through the Idaho portion of the study area and the remainder or Oregon, but they are not quantified here.

7.1 Methodology

Upon construction of the TVRC, economic impacts can potentially occur through three primary mechanisms:

1) **Construction Spending**—Expenditures on labor, raw materials, and transportation associated with construction of the facility. These are primarily derived from the portion of the State of Oregon's capital investment in the facility.
2) **Facility Operations**—Expenditures on labor associated with operating the facility. These are derived from fees that users of the facility will pay.
3) **Grower/Shipper Cost Savings**—Cost savings that accrue to users of the facility that are then spent on other economic activities in the region. This is conditional on the costs of using the facility being lower than existing alternative transportation options.

Items 1 and 2 are easily quantified based upon available information. Construction Spending impacts are developed based on estimates detailed in Section 6.2 on page 48. Facility Operation impacts are developed from the proforma which estimates the labor requirements necessary to operate the facility.

Item 3 is more nebulous, difficult to quantify, and is not included as an input in the economic impact analysis. Although there are potential direct benefits to growers and shippers in the region if the facility offered an unlimited quantity of service at lower costs than currently available from alternative transportation means, there is limited available information on the investment, spending, and debt patterns of growers and shippers in the region. This lack of information makes reliable calculation of indirect and induced effects difficult. To the extent that growers and shippers do ultimately observe lower transportation costs, additional economic impacts in excess of those estimated here are likely to occur.

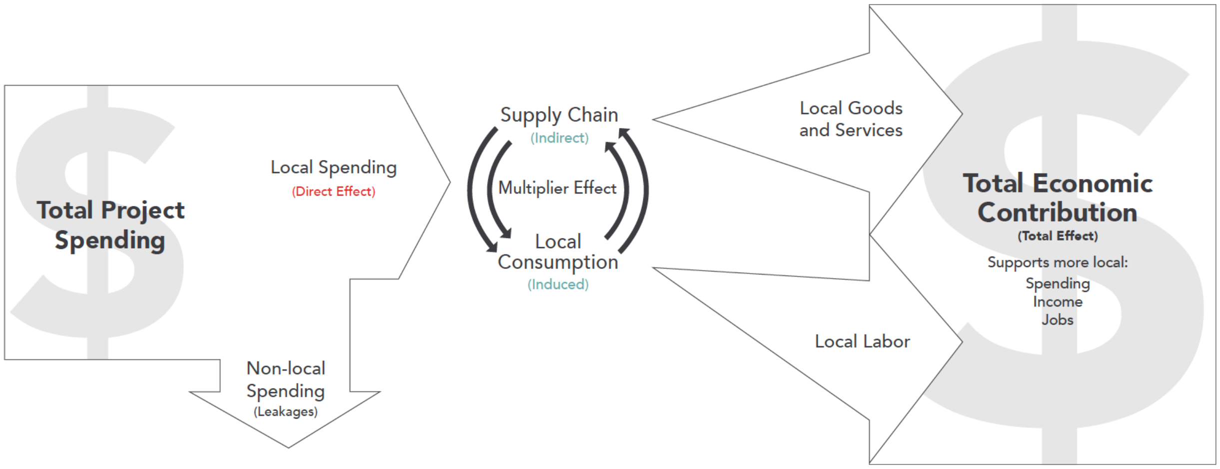
Input-Output Modeling

The economic contribution of the TVRC is calculated using the 2016 version of IMPLAN, an input-output model that calculates the increases in jobs, incomes, and output statewide that happen as money is spent locally. The increases are the result of the "multiplier effect" that occurs as dollars circulate throughout the economy.

Economic contribution studies use specific terminology to identify different types of economic effects that can be modeled using input-output tools. More specifically, the IMPLAN model provides estimates of the effects of the expenditures on income and employment that follow from direct, indirect, and induced expenditures (See Figure 32).

- **Direct effects** are the output, jobs, and income associated with the immediate effects of final demand changes. These are typically described as the "inputs" to the model.
- **Indirect effects** are production changes in backward-linked industries caused by the changing input needs of directly affected industries. Suppliers to the directly involved industry will also purchase additional goods and services; spending leads to additional rounds of indirect effects. Because they represent interactions among businesses, these indirect effects are often referred to as supply-chain effects.
- **Induced effects** are the changes in regional household spending patterns caused by changes in household income. The direct and indirect increases in employment and income enhance the overall purchasing power in the economy, thereby inducing further spending by households. Employees in these industries, for example, will use their income to purchase groceries or take their children to the doctor. These induced effects are often referred to as consumption-driven effects.

Figure 32. Economic Effects Arise from Spending to Generate Total Economic Contribution



Source: ECONorthwest

Taken together, these combined economic effects (direct + indirect + induced) describe the total contribution to the regional economy from the TVRC. These effects are measured in terms of output, income, and jobs, which are defined as:

- **Output** represents the value of all goods and services produced from an event, and it is the broadest measure of economic activity.
- **Labor Income** consists of employee compensation and proprietor income, and it is a subset of output. This includes workers' wages and salaries, as well as other benefits such as health, disability, and life insurance, retirement payments, and non-cash compensation.
- **Jobs** are measured in terms of full-year-equivalents (FYE). One FYE job equals work over twelve months in an industry (this is the same definition used by the federal government's Bureau of Labor Statistics).

Although the facility will be built in Nyssa, not all of the initial expenditures are re-spent in the study region. Some spending leaks out of the economy from labor and construction expenditures that occur outside the primary study region. The approach utilized here does not capture these "spillover" effects, but only includes the gross economic contribution to the Oregon counties in the study area.

Limitations of Input-Output Analysis

Input-output models are static models that measure inputs and outputs in an economy keeping prices and macroeconomic conditions fixed. With this information and the balanced accounting structure of an input-output model, an analyst can: 1) describe an economy at one time-period, 2) introduce a change to the economy, and then 3) evaluate the economy after it has accommodated that change.

This type of "partial equilibrium" analysis permits comparison of the economy in two separate states but does not describe how the economy moves from one equilibrium to the next. In partial equilibrium analysis, the researcher assumes that all other relationships in the economy remain the same (other than the initial economic stimulus).

Contrary to dynamic models, static models assume that there are no changes in wage rates, input prices, and property values. In addition, underlying economic relationships in input-output models are assumed constant; there are no changes in the productivity of labor and capital, and no changes in population migration or business location patterns. All production functions in the model are assumed to be linear and substitution effects are generally absent from input-output models. Although these simplifying assumptions can misstate the true effects on the economy of a project or policy, in situations the applications are relatively small, these models can produce a useful approximation.

7.2 Data Inputs

Two primary data sources are necessary to calculate the economic contribution of construction and operations of the Treasure Valley Reload Center to Oregon counties adjacent to the site.

Construction Costs

Preliminary construction cost estimates were provided by Malheur County Economic Development Corporation and are broken out by general category, including engineering, permitting, site improvements, wetland mitigation, reload building construction, rail improvements, and utilities (summarized in Figure 22 on page 49). Where necessary, a set of assumptions were used to determine the proportion of expenditure that occurs outside the counties adjacent to the site, with rail infrastructure and associated specialized labor predominantly coming from outside the region. Figure 33 shows the construction cost inputs to the IMPLAN model. This is based on the costs summarized in Figure 22, adjusted to reflect several assumptions:

- Costs for railroad track were excluded since it is not produced or acquired within the study area. The analysis also assumed the labor used to install the track is specialized and comes from outside the study area.
- Equipment purchases required to operate the facility are included with construction costs, rather than operations costs, because they occur within the first three years of operation and are not associated with an annual expense.

Figure 33. Construction Costs

Construction Category	Amount
Engineering	$1,196,000
Permitting	$ 455,000
Site Roadways Layout, Utilities, Stormwater	$ 4,380,000
Reload Building	$6,758,000
Water Extension	$1,283,000
Exterior Road Improvements	$3,080,000
Eligible Rail Construction	$3,452,000
Facility Equipment	$499,668
Total	$21,103,668

Source: ECONorthwest using data from construction engineers

Operating Costs

Figure 34 summarizes the operating costs used to calculate the economic contribution associated with operating the TVRC. These are average annual costs, which occur each year the TVRC operates as described elsewhere in this report.

Figure 34. Operating Costs

Operating Category	Amount
Utilities	$30,554
Insurance	$12,731
General Property Expenses	$23,870
Wages and benefits	$1,235,893
Total	$1,303,048

Source: ECONorthwest

7.3 Results

Figure 35 and Figure 36 show the economic contributions of constructing and operating the TVRC. Construction contributions occur only during the construction period and cease once complete. Operational contributions occur every year that the facility operates.

The construction of the TVRC will support $18.1 million in direct output, $5.4 in direct labor income, and almost 150 direct jobs. Spending circulates through the local economy resulting in indirect and induced effects. Combined with the direct effects, construction generates a total of $23.7 million in output, $10.8 million in labor income, and about 200 jobs. Total direct output differs from total construction costs shown in Figure 33 because some of the construction spending occurs outside the study area. The analysis relies on default local purchase percentages built into the IMPLAN model. To the extent that actual project spending differs from these local averages, economic contributions in the study area may be smaller (less spending locally than average) or larger (more spending locally than average).

Figure 35. Economic Contribution of Construction Activities, 2018$

Impact Type	Output	Value Added	Labor Income	Jobs
Direct	18,187,189	8,149,463	5,463,735	148
Indirect	2,799,338	1,290,042	834,274	26
Induced	2,714,778	1,456,517	807,797	26
Total	23,701,305	10,896,022	7,105,806	199

Source: ECONorthwest

Operating the facility will support $2.1 million in output, $1.2 in labor income, and approximately 16 jobs every year. Summing the direct, indirect, and induced effects results in $2.7 million in total output, $1.4 million in total labor income, and 21 total jobs supported by the facility.

Figure 36. Economic Contribution of Operations, 2018$

Impact Type	Output	Value Added	Labor Income	Jobs
Direct	2,129,313	2,062,158	1,235,893	16
Indirect	95,737	47,405	12,737	0.4
Induced	518,691	277,918	154,652	4.9
Total	2,743,742	2,387,481	1,403,282	21.3

Source: ECONorthwest

8 Transportation Cost Savings

Construction of the TVRC has the potential to generate cost savings, both to private users of the facility as well as to the general public. The following sections use inputs from Sections 5 and 6, along with information from federal regulatory impacts analyses to estimate the anticipated savings to Oregon's transportation network. All calculated values are estimates that demonstrate appropriate scale and are rounded to the nearest thousandth to implying undue precision.

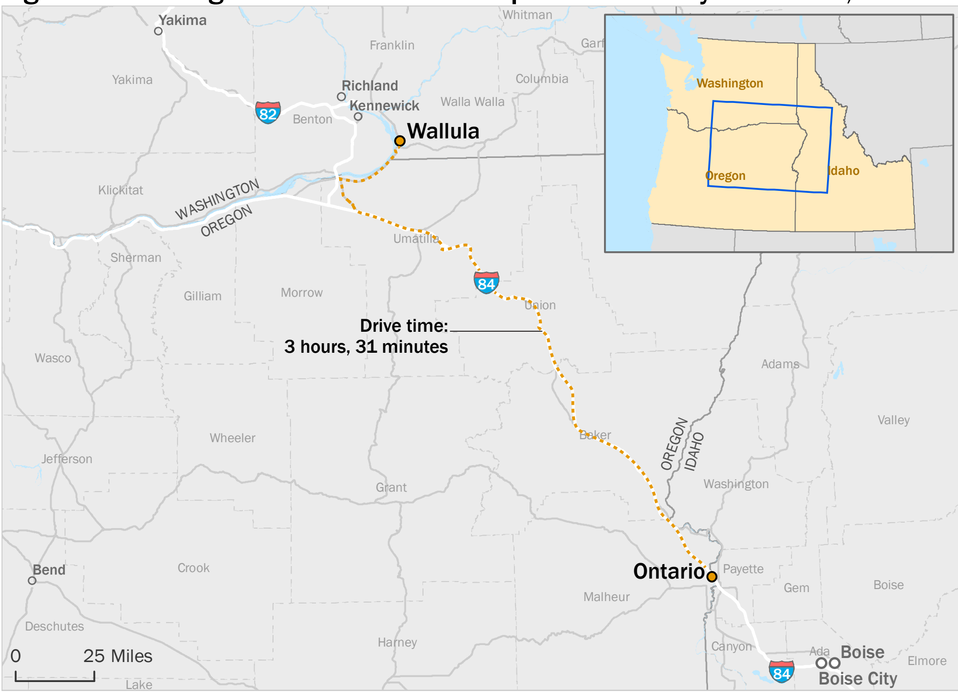
8.1 Private Benefits

Private transportation cost savings may accrue to users of the facility who face lower transportation costs than current alternatives. These benefits only accrue if user fees are lower than alternative shipping modes that provide the same level of service. Although, generally, rail per-mile transportation costs are lower than truck for large volumes over long distances, these lower costs may not always be observed at the TVRC. There are many underlying economic reasons this might not occur, including scarcity induced by the capacity of the facility and availability of substitutes. Since the facility is being constructed at a scale that is incapable of handling the total volume of products shipped in the region, competition for available capacity will occur, resulting in pricing that most efficiently allocates that capacity. Furthermore, the current mix of shipping alternatives will continue to exist, allowing growers and shippers to choose the alternative that provides the best level of service, reliability, and timeliness necessary. Calculation of the scale of anticipated private benefits, however, can be performed using expected trucking costs and a basic set of assumptions on markets served.

8.1.1 Framework

Section 5 above calculates the estimated demand for the facility. As described in Figure 18, a portion of that demand comes from existing rail service in the region, while an additional portion comes from goods shifting from truck to rail. Some of this latter portion may be onions shipped long distances, some may be onions shipped by truck to the ColdConnect facility in Wallula (WA), and then shipped by rail to points east. These shipments travel east through Nyssa (OR). These locations are shown in Figure 37 below.

Figure 37. Driving Distance to Nearest Equivalent Facility in Wallula, WA



Source: ECONorthwest

In order to generate conservative estimates of benefits, this section assumes that the entire volume of "new" onion shipments is shifted from Wallula. Thus, private transportation cost savings are equal to the one-way truck shipping cost to Wallula. Assuming that these trucking services can be procured from the long-distance trucking market, per-mile costs from the USDA's Agricultural Refrigerated Truck Quarterly are used to approximate these cost savings.

There are potential rail cost savings in based on the marginal per-mile cost from Wallula to Nyssa. However, rail service is a function of the relative demand and scarcity for rail cars and trackage. Limited resources are likely to be allocated to the most relatively profitable use. The supply of rail services is relatively fixed in the short term and price inelastic, thus it is reasonable to expect rail transit charges from Nyssa to be roughly equivalent to other nearby facilities, in additional to facility access fees. Thus, rail charges are excluded from the estimate of private transportation cost savings. The resulting calculation is as follows:

Potential value of private transportation cost savings:

Private Transportation Cost Savings = (Cost to ship to Wallula by refrigerated truck) * (Distance) * (Truck-equivalent loads)

Private Transportation Cost Savings = ($2.07 per mile[44]) * (210 miles) * (4,214 truck-equivalent loads)

[44] USDA. "Agriculture Refrigerated Truck Quarterly." Retrieved July 26, 2018, from https://www.ams.usda.gov/services/transportation-analysis/agrtq.

Private Transportation Cost Savings = $1,831,000 per year

When evaluated over a twenty-year timeframe—from 2020 to 2040—at a 3 percent and 7 percent discount rate, these savings amount to between $18,129,000 and $26,448,000. These transportation cost savings are likely to be captured in the private market by either growers, shippers, the facility operator, or Union Pacific.

8.2 Public Benefits

This section calculates the monetary value of the public benefits derived from the TVRC, particularly by shifting the transportation of commodities from Oregon highways to rail. Public benefits accrue when goods that are non-rival and non-excludable are improved. Although the values can often be inferred from private market transactions, public goods are not regularly bought and sold. This analysis draws information from published economic literature and relevant federal guidance to calculate a range of benefits accruing to Oregon residents from the construction of the TVRC.

The existing baseline scenario used to inform this analysis involves either refrigerated or dry-van eighteen-wheeler trucks carrying full loads of agricultural products apiece departing from Ontario, OR and driving to Wallula, WA to deliver them to an existing distribution site, which then transports these loads across the United States to various cities on the east coast via rail. Although the full suite of public benefits is broad, this analysis only focuses on the benefits from loaded trucks from highways inside the State of Oregon. As described earlier, the TVRC is expected to remove approximately 1.6 million CWT from Oregon highways per year. This is the estimate of new shipments detailed in Section 5.6 on page 43, and amounts to approximately 4,214 trucks[45].

Shifting loads from truck to rail provides efficiencies that generate private cost benefits, as well as benefits that accrue to the public, including reduced pollution, congestion, highway wear and tear, and fewer accidents. The following subsections discuss in detail the benefits of removing loaded eighteen-wheeler trucks from urban interstates in eastern Oregon, primarily in Malheur, Baker, Union, and Umatilla Counties. They are as follows:

- **Improved Highway Safety**
- **Air Pollution and Greenhouse Gas Reduction**
- **Reduced Highway Maintenance Costs**

8.2.1 Framework

As in the calculation of private benefits above, public benefits are estimated for a conceptual framework that reduces the shipment of commodities from Ontario, Oregon to Wallula, Washington by truck, and then back by rail. Figure 38 depicts the conceptual basis for

[45] A number of different CWT to truck conversions are available. The conversion used here is based on a 33 pallet, 1.7 CWT per pallet load. Obtained from discussions with industry.

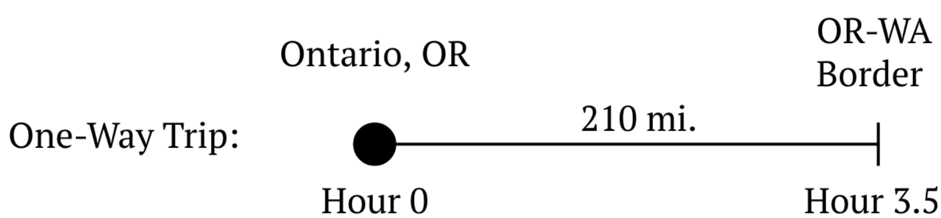
estimating benefits for removing trucks from highways in the State of Oregon.[46] Since the marginal effect of many of the public benefits varies across time and distance, it also details the distance traveled on I-84, Highway 207, and U.S. Route 730 and the relative driving hour for when drivers cross the Oregon-Washington border into Washington. While this conceptual example does not precisely mirror the full set of transportation actions being made, it is roughly representative and serves as a basis for estimating the scale of public benefits.

In the analysis to follow, it is important to note the calculations monetizing these public benefits rely heavily on assumptions. These calculations do not account for the universe of specific trade-offs when trucks are removed from Oregon interstates. For example, when calculating the benefit of reduced congestion, the potential scenario of private passenger vehicles or light trucks replacing the space created on highways as a result of the eighteen wheelers removed is not considered. Additionally, assumptions are made on the given weight for each eighteen-wheeler, a specific driving route, and an amount of time taken to drive this route. Any deviation from these assumptions will result in public benefits being reduced (e.g., private passenger vehicles replacing eighteen wheelers, trucks taking a longer driving route, trucks being only partially loaded) or increased (e.g., highway congestion worsens). For this reason, all values are produced as a range and are intended to demonstrate the potential scale of public benefits.

Driving Distance Assumptions

The distance from Ontario to the Oregon-Washington border is approximately 3 hours and 25 minutes, or about 210 miles (Figure 38).[47] Drivers spend about 3.5 hours of their driving route on Oregon interstates. For simplicity, it is assumed that truck drivers occupy Oregon interstates for their full first, second, and third hours of driving. Their fourth hour, while partial, is also in Oregon.

Figure 38. Truck Travel Route from Ontario, OR to Oregon- Washington Border South of Wallula, WA, by Driving Hour



Source: ECONorthwest.

[46] Although each category of public benefits will accrue to other states where trucks are removed from the road (e.g. Washington and Idaho), they are not calculated here.

[47] This distance is according to Google Maps. Note the approximate times of travel do not account for every driving contingency such as congestion, road construction, inclement weather, or crashes.

Truck Weight Assumptions

Two assumptions are made regarding the weight of eighteen wheelers. These will be restated when employed in calculations to follow.

- The typical weight of a Class 8 truck tractor is approximately 17,000 pounds or 8.5 tons.[48,49]
- A standard 53-foot refrigerated van—the cargo unit attached to the back of the truck tractor—has an approximate tare weight (empty) of 15,500 pounds (7.75 tons) and can hold up to a maximum of 45,000 pounds.[50]

Combining the weight of the truck tractor with an empty 53-foot refrigerated van, the approximate typical tare weight of an eighteen-wheeler is about 16.25 tons. It is important to note, however, that this tonnage can vary widely based on the type of truck tractor and the trailer attached to it. When each refrigerated truck is loaded with 21.25 tons of onions, the truck weighs about 37.5 tons.

8.2.2 Marginal Costs

Marginal costs are essential for understanding travel impacts as they illustrate the incremental cost per extra mile driven on interstates. These costs, though not regularly considered by road users, are imposed on drivers (travel time, costs of vehicle operation), public agencies (road maintenance), and they externally affect other highway users by congestion and, more broadly, communities by pollution. It should be noted that while these marginal costs illuminate the incremental cost per mile, their value will vary based on time of day. For example, the marginal cost of congestion during peak travel periods through Portland will be higher than during non-peak travel periods.

Highway Safety

Large trucks have been involved in fatal crashes on Oregon roadways. To contextualize the number of fatal crashes and fatalities involving large trucks on Oregon roadways, Figure 39 and Figure 40 provide trend analyses of these statistics over the last eleven years, respectively.[51] It is important to note not all of these fatal crashes and fatalities necessarily occurred on interstate freeways; more generally, these statistics describe the number of fatal truck crashes on public roadways. Over the 2006 to 2016 timeframe in Oregon, the largest number of fatal crashes

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[48] U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy. 2010. *Fact #620: April 26, 2010 Class 8 Truck Tractor Weight by Component*. Retrieved from https://www.energy.gov/eere/vehicles/fact-620-april-26-2010-class-8-truck-tractor-weight-component.

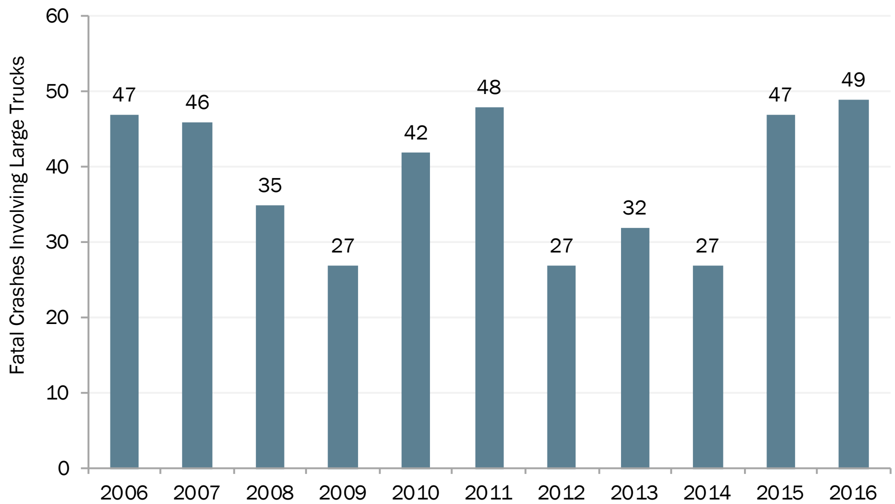
[49] This is according to the Federal Highway Administration. Class 8 trucks are classified as weighing more than 33,001 pounds. See the Alternative Fuels Data Center at https://www.afdc.energy.gov/data/10380.

[50] Ship North America Transportation. Equipment – Truck, Truck Trailers & Van Specifications. Retrieved from https://www.shipnorthamerica.com/htmfiles/equipment.html.

[51] U.S. Department of Transportation, Federal Motor Carrier Safety Administrations, Analysis Division. 2018. Large Truck and Bus Crash Facts 2016. Report No. FMCSA-RRA-17-016. Retrieved from https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/safety/data-and-statistics/398686/ltbcf-2016-final-508c-may-2018.pdf.

occurred in 2016 at 49. Averaging the eleven years of data, about 43 fatal truck crashes occurred per year.

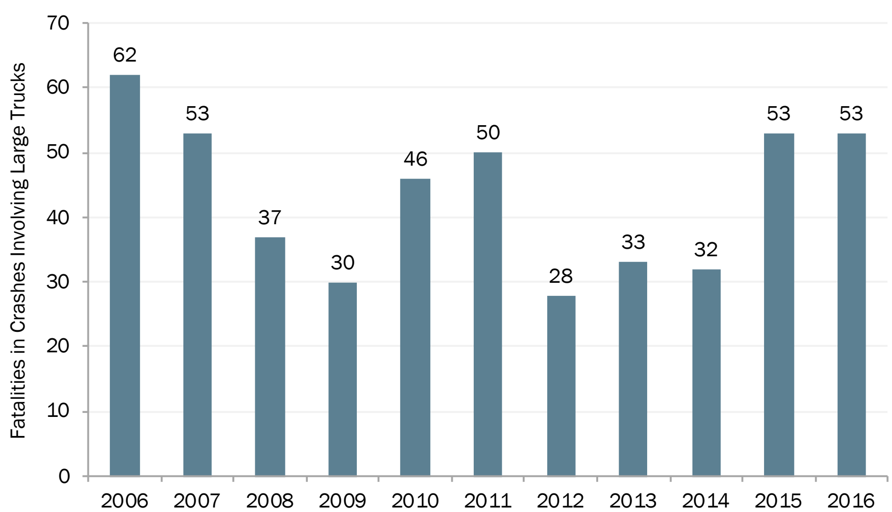
Figure 39. Fatal Crashes Involving Large Trucks, 2006-2016



Source: U.S. Department of Transportation, Large Truck and Bus Crash Facts 2016.

The number of fatalities from crashes involving large trucks has fluctuated over the last eleven years. During the 2006 to 2016 timeframe, the largest number of fatalities occurred in 2006 at 62. Over these eleven years, the lowest number of fatalities was 28 in 2012. In 2015 and 2016, however, the number of fatalities rose to 53 in each year. On average, 39 fatalities from crashes involving large trucks occurred each year in Oregon over the past eleven years.

Figure 40. Fatalities in Crashes Involving Large Trucks, 2006-2016



Source: U.S. Department of Transportation, Large Truck and Bus Crash Facts 2016.

There are additional estimates of the rate of large truck at-fault crashes reported by the Oregon Department of Transportation.[52] From 2013 through 2017, there was an average of 0.43 large truck crashes involving a fatality, injury, or disabling damage per million vehicle miles traveled. Additionally, there were 1.32 deaths per 100 million vehicle miles traveled on Oregon roads in 2016.

To approximate the monetary value of increased highway safety via the removal of trucks from Oregon interstates, two ranges of estimates are generated. One range uses the Value of a Statistical Life (VSL) to approximate the monetary value of fatalities prevented. The other range is based more broadly on accidents, specifically how removing trucks from highways decreases this negative externality experienced by other users of interstates.

First, the range for potential fatalities prevented as a result of removing trucks from Oregon interstates is calculated. The U.S. Department of Transportation (U.S. DOT) reported a VSL of $9.6 million for 2016 in their revised VSL Guidance memorandum.[53] Using the Consumer Price Index published by the Bureau of Labor Statistics, the 2016 VSL value is adjusted to 2018 dollars.[54] This inflation adjustment raises the VSL to $9.91 million.

Potential value of fatalities prevented, U.S. DOT VSL:

Potential value of fatalities prevented = (U.S. DOT VSL) * (Fatality rate, per mile) * (Trucks trips removed from interstates per year) * (Miles per truck trip)

Potential value of fatalities prevented = ($9.91 mill.) * (1.32 / 100 mill) * (4,214 trucks) * (210 miles)

Potential value of fatalities prevented = $116,000 per year

A particularly dangerous stretch of roadway on I-84 in Oregon is Deadman's Pass. This corridor is about ten miles in length and lies about 9 miles east of the city of Pendleton, Oregon. Depending on direction of travel, traversal of Deadman's Pass is perilous insofar that elevation climb is steep over a short distance and the roadway has a handful of hairpin turns. When trucks drive in the east-west direction, toward Pendleton from the Idaho border, the downgrade is treacherous.

Vehicle crash data from the Oregon Department of Transportation's Crash Data System allows quantification number of truck crashes on this stretch of I-84 which approximately begins/ends with mileposts 217 and 227, depending on direction of travel (driving east-west, this would be from milepost 227 to 217; in the west-east direction, it would be milepost 217 to 227). The total number of highway crashes occurring in Umatilla County, the number of those crashes that

[52] ODOT Motor Carrier Division and ODOT Transportation Development Division, Crash Analysis and Reporting Unit.

[53] U.S. Department of Transportation, Office of the Secretary of Transportation. 2016. *Memorandum to: Secretarial Officers Modal Administrators; Subject: Guidance on Treatment of the Economic Value of a Statistical Life (VSL) in U.S. Department of Transportation Analyses—2016 Adjustment*. Retrieved from https://www.transportation.gov/sites/dot.gov/files/docs/2016%20Revised%20Value%20of%20a%20Statistical%20Life%20Guidance.pdf.

[54] U.S. Department of Commerce, Bureau of Labor Statistics. 2018. *Consumer Price Index, All Urban Consumers, Not Seasonally Adjusted Series, All Items, U.S. City Average*. Retrieved from https://www.bls.gov/cpi/data.htm.

were truck crashes, and number of truck crashes that occurred just along the Deadman's Pass corridor, from milepost 217 to 227 are identified in Figure 41 below.

Figure 41. Umatilla County Highway Crashes, Truck Crashes, and Truck Crashes on Deadman's Pass, 2012-2016

Year	Umatilla County State Highway Total Crashes	Umatilla County State Highway Truck Crashes	Truck Crashes between Mileposts 217 and 227 (Deadman's Pass)
2012	607	95	26
2013	570	85	11
2014	693	138	45
2015	601	85	7
2016	677	87	15
Total, 2012-2016	3,148	490	104
Avg. Annual, 2012-2016	630	98	21

Source: Oregon Department of Transportation, Crash Data System, 2012-2016.

On average, over 2012 to 2016, there were 630 crashes on Umatilla County interstates. Over this same period, there were approximately 98 truck crashes on average. These truck crashes accounted for about 16 percent of all vehicle-related accidents reported by the Oregon Department of Transportation in Umatilla County. On the approximate ten-mile stretch comprising Deadman's Pass, on average, 21 truck crashes occurred annually over 2012 to 2016. This means about 21 percent of truck crashes occurring on Umatilla County interstates took place on Deadman's Pass. Although the facility is expected to reduce the number of trucks travelling on this stretch of highway, it is not possible to draw a direct relationship between that volume and the number of accidents expected. The monetary value related to truck removal from Deadman's Pass is not calculated, however, given the overall reduction of trucks from I-84 in this analysis, it is possible fewer accidents may take place on this stretch of roadway.

Aside from reducing fatalities on roadways, there are additional benefits from the reduction in general accidents. In a technical report from Blanco, *et al.* (2011), they estimate the rate of Safety Critical Events (SCE) as a function of driving hour.[55] An SCE is any crash, near-crash, crash-relevant conflict, or unintentional lane deviation. These rates help us estimate the potential number of accidents that could occur from eighteen-wheelers while they drive through Oregon. Using Blanco, *et al.*'s estimates provided in Figure 42, the average rate of SCE across driving hours 1, 2, 3, and 4 is 0.135.

[55] Blanco, et al. (May 2011). The Impact of Driving, Non-Driving Work, and Rest Breaks on Driving Performance in Commercial Motor Vehicle Operations. U.S. Department of Transportation, Federal Motor Carrier Safety Administration. Retrieved from https://www.researchgate.net/publication/280569039.

Figure 42. Rate of SCE Occurrence by Driving Hour

Driving Hour	SCEs Per Driving Hour	Total Opportunities Per Driving Hour	Rate of SCE Occurrence
1	218	1,864.60	0.117
2	230	1,826.97	0.126
3	235	1,786.90	0.132
4	285	1,715.56	0.166
5	263	1,612.94	0.163
6	265	1,477.66	0.179
7	248	1,261.41	0.197
8	154	1,021.06	0.151
9	125	808.78	0.155
10	98	553.16	0.177
11	76	321.48	0.236

Source: Blanco, et al. (2011). Table 11, page 29.

It is expected that there will be a reduction in approximately 1,991 safety SCEs per year (0.135 SCE rate * 4,214 trucks * 3.5 hours driving per truck) from removing trucks from the roads.

While there is no explicit monetary estimate for a reduction in SCEs, a range of values of general accidents prevented by removing trucks from Oregon interstates is available from evaluations of several federal highway regulations. According to the EPA's final rulemaking regarding greenhouse gas emissions standards and fuel efficiency standards for heavy-duty trucks, the marginal cost per freeway mile driven of an accident range from a low estimate of $0.01 to a high of $0.08.[56] The 'Middle' estimate, or $0.03, is used to approximate the value of accidents avoided.

Figure 43. Cost of Highway Externalities for Combination Tractors per Mile, in 2018 dollars

Highway Impact	High	Middle	Low
Noise	$0.06	$0.02	$0.01
Accidents	$0.08	$0.03	$0.01
Congestion	$0.37	$0.13	$0.03
Combined	$0.51	$0.18	$0.05

Source: U.S. EPA. Final Rulemaking to Establish Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles, Regulatory Impact Analysis. Table 9-10: Low-Mid-High Cost Estimates.

For comparison, Figure 44 details the marginal cost of each urban interstate mile driven for various externalities by truck weight per the Federal Highway Administration's (FHWA) 1997 Addendum to their Highway Cost Allocation Study. A number of the externalities listed in this table will be referenced in later sections and employed in other calculations. These values, originally reported in 2000 dollars, have been adjusted to 2018 dollars using the CPI. Given the

[56] U.S. Environmental Protection Agency, Office of Transportation and Air Quality, and U.S. Department of Transportation, National Highway Traffic Safety Administration. 2011. *Final Rulemaking to Establish Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles, Regulatory Impact Analysis*. Report No.: EPA-420-R-11-901. Retrieved from https://nepis.epa.gov/Exe/ZyPDF.cgi/P100EG9C.PDF?Dockey=P100EG9C.PDF.

focus on eighteen wheelers, the pertinent estimate for marginal crash costs from Figure 44 is '80 kip 5-axle Comb.' as this is the closest truck weight to the refrigerated trucks in consideration. The marginal crash value for this vehicle class is $0.017, or approximately 2 cents, per interstate mile driven.

Figure 44. Marginal Cost of Incremental Highway Mile Driven, by Vehicle Class on Urban Interstates, in Cents per Mile, 2018 dollars

Vehicle Class on Urban Interstate	Pavement	Congestion	Crash	Air Pollution	Noise	Total
40 kip 4-axle S.U. Truck	$0.045	$0.352	$0.012	$0.065	$0.022	$0.496
60 kip 4-axle S.U. Truck	$0.261	$0.470	$0.012	$0.065	$0.024	$0.832
60 kip 5-axle Comb.	$0.151	$0.265	$0.017	$0.065	$0.040	$0.537
80 kip 5-axle Comb.	$0.589	$0.289	$0.017	$0.065	$0.044	$1.002

Source: U.S. Department of Transportation, Federal Highway Administration. Addendum to the 1997 Federal Highway Cost Allocation Study, Final Report

Potential value of highway accidents avoided, EPA accident value:

Value of accidents avoided = (EPA's marginal cost of crash) *(Truck miles driven) * (Number of trucks removed from interstates per year)

Value of accidents avoided = ($0.03) * (210 miles) * (4,214 trucks per year)

Value of accidents avoided = $27,000 per year

Potential value of highway accidents avoided, FHWA accident value:

Value of accidents avoided = (FHWA's marginal cost of crash) * (Truck miles driven) * (Number of trucks removed from interstates per year)

Value of accidents avoided = ($0.017) * (210 miles) * (4,214 trucks per year)

Value of accidents avoided = $15,000 per year

Greenhouse Gas Reduction and Air Pollution

Shifting transported commodities from trucks to rail reduces greenhouse gases (GHGs) and air pollution. The primary reason for this is that rail can transport cargo further per ton-mile of fuel consumed. According to the EPA, "the most important greenhouse gases directly emitted by humans include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and several other fluorine-containing halogenated substances."[57] In their 2018 Inventory of U.S. Greenhouse Gas Emissions and Sinks, the EPA reports approximately 2.2 percent of the U.S.'s GHG emissions (CO_2, CH_4, N_2O, HFCs, Other Emissions from Electric Power) in 2016 came from rail transportation. Medium- and heavy-duty trucks contributed to 22.9 percent of the total GHG emissions (CO_2, CH_4, N_2O, HFCs) in 2016. Other gases accounted for in this section include

[57] U.S. EPA. 2018. *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2016.* Report No.: EPA 420-R-18-003. Retrieved from https://www.epa.gov/sites/production/files/2018-01/documents/2018_complete_report.pdf.

indirect greenhouse gases, which do not necessarily contribute to the global warming effect, but they indirectly impact the Earth's atmosphere "by influencing the formation and destruction of tropospheric and stratospheric ozone …."[58] Among these are carbon monoxide (CO), nitrogen oxides (NO_x), volatile organic compounds (VOCs), sulfur dioxide (SO_2), and others. Particulate matter ($PM_{2.5}$), ammonia (NH_3), nitrogen oxides, sulfur dioxide, and VOCs are gasses that affect human health and air quality.[59] The human health component is monetized later in this section as it relates to the reduction of these harmful gasses from fewer trucks.

The Texas Transportation Institute (TTI) estimated railroads moved approximately one ton of cargo 478 miles per gallon of fuel in 2009. In comparison, trucks moved one ton of freight 150 miles per gallon.[60] Thus, railroad transportation is more fuel efficient for moving cargo relative to trucks, and as a result of consuming less fuel, railroad transportation produces fewer GHGs.

The TTI report estimates railroads produce one ton of GHG per 47,308 ton-miles while trucks produce one ton of GHG per 5,802 ton-miles.[61] Below is the calculation for the quantity of GHG emitted by a single truck driving on Oregon interstates.

From Ontario to Oregon-Washington Border:

Travels 210 miles at 37.5 tons (full load) = (210 miles) * (37.5 tons) = 7,875 ton-miles

Thus, one truck travels 7,875 ton-miles and produces 1.35 tons of GHG (7,875 divided by 5,820).

One way to estimate the impacts of taking trucks off the road in favor of rail is calculating the reduction of carbon dioxide (CO_2) emissions by using the social cost of carbon (SCC). Figure 45 shows the social costs of CO_2 per metric ton across various discount rates published by the EPA.[62]

[58] *Ibid*.

[59] U.S. EPA. 2018. CO-*Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool*. https://www.epa.gov/statelocalenergy/co-benefits-risk-assessment-cobra-health-impacts-screening-and-mapping-tool

[60] Kruse, J. C., Protopapas, A., Olson, L. E. 2012. *A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001-2009*. College Station, TX: Texas Transportation Institute, The Texas A&M University System. Retrieved from http://nationalwaterwaysfoundation.org/study/FinalReportTTI.pdf

[61] *Ibid*.

[62] U.S. Environmental Protection Agency. 2011. *Final Rulemaking to Establish Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles, Regulatory Impact Analysis*. Report No. EPA-420-R-11-901. Retrieved from https://nepis.epa.gov/Exe/ZyPDF.cgi/P100EG9C.PDF?Dockey=P100EG9C.PDF

Figure 45. Social Cost of Carbon per Metric Ton, 2012–2050, 2018 dollars

Year	5% Avg. Discount	3% Avg. Discount	2.5% Avg. Discount	3%, 95th Percentile
2012	$6.10	$26.64	$43.36	$81.04
2015	$6.85	$28.40	$45.72	$85.53
2020	$8.10	$31.31	$49.66	$96.09
2025	$9.86	$35.16	$54.63	$107.58
2030	$11.61	$38.99	$59.59	$119.07
2035	$13.37	$42.84	$64.56	$130.56
2040	$15.12	$46.68	$69.54	$142.05
2045	$16.90	$50.07	$73.47	$152.11
2050	$18.69	$53.46	$77.40	$162.18

Source: U.S. EPA. Final Rulemaking to Establish Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles, Regulatory Impact Analysis.

Using the 2020 SCC value across various discount rates from Figure 45, a range of values is generated for carbon removed from the atmosphere as a result of taking 4,214 eighteen wheelers off the road each year.

Social cost of carbon, 5 percent discount rate:

SCC at 5 percent discount = (2020 value at 5 percent) * (Tons of GHG produced by one truck) * (Trucks removed from interstates/year)

SCC at 5 percent discount = ($8.10) * (1.35 tons of GHG per truck) * (4,214 trucks/year)

SCC at 5 percent discount = $46,000/year

Social cost of carbon, 3 percent discount rate:

SCC at 3 percent discount = ($31.31) * (1.35 tons of GHG/truck) * (4,214 trucks/year)

SCC at 3 percent discount = $178,000/year

Social cost of carbon, 2.5 percent discount rate:

SCC at 2.5 percent discount = ($49.66) * (1.35 tons of GHG/truck) * (4,214 trucks/year)

SCC at 2.5 percent discount = $283,000/year

In addition to computing the social cost of carbon, the human health impacts of air pollution are also estimated. These impacts manifest themselves through respiratory complications, premature mortality, cardiovascular illnesses, and other afflictions. Delucchi, *et al.* (2010) estimated an air pollution health cost value of 1.55 cents per ton-mile (in 2006 dollars) for heavy-duty diesel vehicles using the Co-Benefits Risk Assessment Screening Model (COBRA).[63] COBRA is a screening and mapping tool developed by the EPA that estimates "the economic

[63] Delucchi, M. and McCubbin, D. 2010. Ex*ternal Costs of Transport in the U.S. Davis, CA: University of California, Davis, Institute of Transportation Studies*. Retrieved from https://escholarship.org/uc/item/13n8v8gq.

value of the health benefits associated with clean energy policies and programs to compare against program costs."[64] It estimates emissions of particulate matter, sulfur dioxide, nitrogen oxides, ammonia, and volatile organic compounds. As a result, this estimate calculated by Delucchi, *et al.* (2010) does not overlap with the public benefits accrual associated with carbon reduction. The cost estimate is adjusted to 2018 dollars using the C.P.I., resulting in a health cost of approximately 1.91 cents per ton-mile, or $0.019. Furthermore, our operating scenario involves offsetting trucks travelling from the Treasure Valley to Wallula, Washington by truck, after which product is loaded on trains travelling east, back through Nyssa, Oregon. The human health cost associated with moving a truck-equivalent load one mile by rail is $0.0043. These two air pollution effects are additive and are calculated below.

Human health benefit of reducing air pollution, heavy-duty diesel vehicle portion:

Value of air pollution reduced = (Delucchi, *et al.*'s value of air pollution) * (Ton-miles driven per truck) * (Trucks removed from interstates per year)

Value of air pollution reduced = ($0.019) * (7,875 ton-miles) * (4,214 trucks per year)

Value of air pollution reduced = $631,000

Human health benefit of reducing air pollution, rail portion:

Value of air pollution reduced = ($0.0043) * (7,875 ton-miles) * (4,214 trucks per year)

Value of air pollution reduced = $143,000

The sum of the two values calculated above is $774,000. In other words, removing 4,214 trucks per year from Oregon interstates would yield an approximate human health benefit of $774,000 assuming no private passenger vehicles replace the space created by the absent trucks.

The FHWA similarly reports air pollution marginal costs per driving mile of $0.065 in Figure 44, though this value is more general, and it does not directly evaluate the impact on human health. It estimates the difference in air pollution concentrations between highway traffic and no highway traffic. The calculation below can be interpreted as a lower bound estimate of the public benefit of air pollution reduction as its value hinges on cents per mile and not cents per ton-mile as Delucchi, *et al.*'s does.

Benefit of reducing air pollution, FHWA air pollution estimate:

Value of air pollution reduced = (FHWA's marginal cost of air pollution) * (Truck miles driven) * (Trucks removed from interstates/year)

Value of air pollution reduced = ($0.065) * (210 miles) * (4,214 trucks/year)

Value of air pollution reduced = $58,000

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[64] U.S. EPA. 2018. *CO-Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool*. https://www.epa.gov/statelocalenergy/co-benefits-risk-assessment-cobra-health-impacts-screening-and-mapping-tool.

Reduced Highway Maintenance Costs

Freight rail advocates argue that increased rail freight movement significantly reduces highways infrastructure maintenance and expansion costs.[65] Trucks are substantially heavier than private passenger vehicles. A GAO report states, "Although a five-axle tractor-trailer loaded to the current 80,000-pound Federal weight limit weighs about the same as 20 automobiles, the impact of the tractor-trailer is dramatically higher … a tractor-trailer has the same impact on an interstate highway as at least 9,600 automobiles… ."[66] The eighteen wheelers driving on Oregon interstates do not reach the maximum federal weight limit, although on their return trip they come close (37.5 tons). Again referencing Figure 44, the '80 kip 5-axle comb' is used to derive an estimate for the roadway maintenance eighteen wheelers impose on Oregon interstates.

Marginal cost of highway road maintenance:

Value of highway maintenance = (Marginal cost of highway road maintenance, 80 kip 5-axle combination truck) * (Truck miles driven) * (Trucks removed from interstates/year)

Value of highway maintenance = ($0.589) * (210 miles) * (4,214 trucks/year)

Value of highway maintenance = $521,000/year

The annual highway road maintenance benefit of removing 4,214 eighteen wheelers from interstates will approximately equal $521,000. States and the Federal Government regularly conduct Highway Cost Allocation Studies to evaluate highway-related costs attributable to different vehicle classes and determine whether fees paid by different vehicles (e.g. through tolls, transit charges, or gasoline taxes) cover their highway cost responsibility.[67] A fully efficient fee structure where trucks are paying weight-mile fees, motor fuel excise taxes, and registration fees that properly account for their impact on the highway network would result in no external public costs. In order to accommodate the full range of potentially fee efficiency, the value above is used only in the "high" estimate, while a value of zero is used in the "low" estimate.

8.2.3 Summary of Public Benefits

Diverting transported commodities from trucks to rail would help relieve a handful of public costs exerted on the environment, human health, highway maintenance, and congestion. The largest benefits manifest through congestion reduction, lower levels of particulate matter emission and thus a benefit on human health, and a reduction in highway road wear and tear. Figure 46 summarizes the low and high estimates calculated for each public benefit category in order of appearance in this public benefits section.

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[65] Sulbaran, T. and M.D. Sarder. 2013. "Logistical Impact of Intermodal Facilities." *ASEE Southeast Section Conference Proceedings.* Retrieved from http://se.asee.org/proceedings/ASEE2013/Papers2013/183.PDF

[66] Comptroller General's Report to Congress. *Excessive Truck Weight: An Expensive Burden We Can No Longer Support*. Washington, DC: U.S. Government Accountability Office. Retrieved from http://archive.gao.gov/f0302/109884.pdf.

[67] The last Federal Highway Cost Allocation Study was conducted in 1997: https://www.fhwa.dot.gov/policy/hcas/final/toc.cfm.

Figure 46. Potential Annual Benefits, in 2018 dollars

Category of Public Benefit	Low Estimate	High Estimate
Potential value of fatalities prevented	$116,000	$116,000
Potential value of highway accidents avoided	$15,000	$27,000
Social Cost of Carbon	$46,000	$283,000
Human Health	$774,000	$774,000
Air Pollution Reduction	$58,000	$58,000
Reduced Highway Road Maintenance	$0	$521,000
Total	$1,009,000	$1,779,000

Source: ECONorthwest

Figure 47 projects and sums the public benefits in Figure 46 over a twenty-year timeframe—from 2020 to 2040—at a 3 percent and 7 percent discount rate. This analysis timeframe and the chosen discount rates are consistent with federal guidance for preparing economic analyses. The potential present value of public benefits over the next twenty years for the 'Low Estimate' ranges between $9,990,000 (7 percent discount) and $14,574,000 (3 percent discount). The 'High Estimate' is estimated between $17,614,000 and $25,696,000.

Figure 47. Potential Present Value Benefits over 2020 to 2040, in 2018 dollars

Discount Rate	Low Estimate	High Estimate
3 percent	$14,574,000	$25,696,000
7 percent	$9,990,000	$17,614,000

Source: ECONorthwest

9 Conclusions

The proposed Treasure Valley Reload Center can serve transportation needs in the region. Growing highway congestion and a strong reliance on international markets provide a sufficient case for expanding transportation options in the region. The analysis contained in this report estimates that, once fully operational, the facility will load approximately 3 million CWT of onions, generate over $1 million in net operating income, and prevent approximately 5,700 tons of greenhouse gas emissions per year. Operationally, the Malheur County Development Corporation has been successful at building regional partnerships with growers, shippers, the Port of Morrow, and others, providing sufficient evidence for a likelihood of successful operation. Geographically, the facility's location in Malheur County can serve as a gateway to the national transportation network.

Given the findings of financial feasibility and private benefits, it is worth considering the following fundamental economic questions:

1) Why hasn't the private market already provided this service?
2) Why should the State of Oregon intervene in this market?

To address the former, it is worth considering the transportation cost savings versus the capital construction costs. Over a 20 year time-frame, the private transportation cost savings are conservatively calculated in Section 8.1 on page 61 to be $18,129,000 to $26,448,000 in present value, while the construction costs are estimated to be approximately $26 million. At the high end, a private investor has the potential to capture sufficient transportation cost savings to cover the cost of constructing the facility. However, it is unlikely that the operator of the facility would be able to capture all of these profits. Using projected net income calculated in Figure 30, and assuming these continue through 2040, the present value income ranges between $9,716,300 and $14,672,000. This income is insufficient to recoup the initial investment.

To address the latter question, the calculation of public benefits serves as a basis to evaluate the State of Oregon's return on investment. As calculated in Section 8.2 on page 63, the public benefits range between $9,990,000 and $25,696,000. These values are monetized estimates of social externalities that cannot be purchased on the private market. At the higher end, this facility delivers public benefits to the State or Oregon at a level that produces a one-to-one return on investment.

However, there remains a set of necessary conditions for the projections contained in this report to come true. In particular,

- **Cost**—the facility must offer transportation options at or below the cost of utilizing trucks to ship agricultural goods.
- **Reliability**—the facility and rail line must provide a level of service that is consistent and predictable.

- **Timeliness—**agricultural products passing through the facility must reach their subsequent destination in a relatively competitive time window to alternative transportation modes.

Should the above conditions be met, the analysis contained in this report indicates sufficient regional demand necessary to operate the facility in a financially feasible manner.