February 19, 2024

To: Garth Appanaitis, PE, Kayla Fleskes-Lane, PE, Sydney Borek, Alex Correa, EIT (DKS)

From: Sorin Garber, SGA

RE: Airtrans Air Cargo Expansion Project ConnectOregon Grant Application – Analysis Supporting Response to Question 22 about Transportation Costs and Access to Jobs and Sources of Labor

This memorandum documents the analyses used to develop the conclusions provided in the Port of Portland's response to Question 22 of the ConnectOregon grant application about transportation costs and access to jobs and sources of labor.

Question 22: How does the project reduce transportation costs for Oregon businesses or improve access to jobs and sources of labor?

Summary of Findings

The proposed Airtrans Air Cargo Expansion Project of adding one parking space at the ATC facility will significantly reduce truck operating costs for Oregon shippers and businesses. In fact, without the project, these added costs could be so great for carriers, especially 3PL carriers, that those carriers, as well as the businesses they serve who may have to absorb those high costs, may elect to move their operations closer to those airports (and, possibly outside of the State of Oregon) or close their businesses altogether.

- Based on DKS' Ramp Capacity Benefit Tool, the added Airtrans Air Cargo Expansion Project parking space can accommodate a growth of 3.85% over total Airtrans Center current cargo weights.
- A high range growth factor was established (8.35%) based on truck types and their payloads, assuming they were 25% filled in one trip either to or from the ATC.
- Using these growth factors, the Airtrans Air Cargo Expansion project can accommodate 12k to 23k short tons of air cargo/year.
- That translates into about 1,450 to 2,900 truck trips/year.
- Without the project, trucks with air cargo that would be turned away from the Airtrans Center would need to divert to airports that serve the same int'l and domestic markets that the Airtrans Center does - they are SeaTac, Boeing Field, San Francisco Int'l, Oakland and Boise
- The estimated annual truck mileage associated with these diversions is 919k to 1.86M in 2025.

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- The annual survey completed by the American Transportation Research Institute (ATRI) finds that truck operating cost are $2.25.mile (ODOT's TPAU unit uses this reference for their analyses)
- Results:

Avoided Truck Operating Costs with the Proposed ATC Parking Space

Growth Rate Scenario	Avoided Year 2025 Annual Miles	Avoided Year 2025 Annual Operating $		Avoided 20-year (2025-2045) Cumulative Miles	Avoided 20-year (2025-2045) Cumulative Operating $
Average	919,000	$2,067,500		18,378,000	$53,134,250
High	1,855,000	$4,172,700		37,090,400	$107,235,550

In some cases, miles and costs have been rounded.

- Based on these avoided operating cost benefits alone and a total project cost of $6.0 million, the project would result in a near 9:1 benefit-cost ratio.

The proposed Airtrans Air Cargo Expansion project saves Oregon businesses money, allows them to expand their operations and hire additional employees, and continue to reach far flung global and domestic markets.

Introduction

This Airtrans Air Cargo Expansion project grant will allow Oregon's shippers and businesses to continue to provide necessary access to domestic and international customers and markets at low cost. Further, as these businesses grow they will require additional employees, land, facilities, and construction to accommodate that growth. Should air cargo capacity at the Airtrans Center (ATC) not be increased to accommodate this demand, Oregon shippers and businesses will incur new and significant transportation operating costs as they would need to truck their shipments to other West Coast airports – including SeaTac Airport, Boeing Field, Boise Airport, San Francisco International Airport and Oakland Airport - to ship their goods to their customers.

Many of Oregon's unique products, including those produced by Nike, Adidas America and Columbia Sportswear apparel and shoe wear, Intel semiconductors, Tillamook Cheese, Oregon fruits and wines, Pendleton blankets, and numerous other household name companies, require air cargo service to ship and receive their products and materials. These companies are global brands with suppliers and customers across Europe, Asia, South America, Australia, Africa, and throughout the fifty states.

In addition, there are a wide range of lesser-known Oregon businesses shipping machine parts, computer and electronic components, packages, finished wood products, and consumer products that are shipped via the Airtrans facility for distribution to and from businesses and residents throughout Oregon[1].

[1] For a full description of Oregon exports, see *Economic Impact Considerations in Support of Connect Oregon ATC Application - WIP* EcoNorthwest, response to Question 23..

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While several of these companies are headquartered in the Portland region, they manufacture, assemble, finish, supply, and otherwise enable the production of Oregon made products in businesses and branches located elsewhere in Oregon that ship to and from the Airtrans facility.

Trucks, which are the primary mode of transportation bringing and receiving air cargo shipments at ATC, represent a mix of Class 6, 7 and 8 truck types. As shown in Table 1, Class 6 trucks are also known as medium duty trucks with a gross vehicle weight rating (GVWR, or maximum combined truck and cargo weight) between 19,501 and 26,000 lbs. Class 7 and 8 trucks are known as heavy-duty trucks with GVWRs of between 26,001 and 33,000 lbs., and 33,001 and 80,000 lbs., respectively. The maximum payload capacities of these trucks are 11,500 lbs. (Class 6), 18,500 lbs. (Class 7), and 54,000 lbs. (Class 8).

Table 1. Truck Types Commonly Using ATC

Truck Class	Truck Type	Empty Truck Weight (GWR)	Maximum Payload Capacity	Maximum Combined Weight (GVWR)
Class 6	Medium-duty	11,500-14,500 lbs.	11,500 lbs.	19,501-26,000 lbs.
Class 7	Heavy-duty	11,500-14,500 lbs.	18,500 lbs.	26,001-33,000 lbs.
Class 8	Heavy-duty	20,000-26,000 lbs.	54,000 lbs.	33,001-80,000 lbs.

(GWR) – Gross Vehicle Weight
(GVWR) – Gross Vehicle Weight Rating

Integrated carriers (companies that own the vehicles used to move their goods), such as UPS, FedEx, DHL etc., use Class 8 tractor trailers to feed into and out of the ATC. They unload planes and then head to their distribution centers. However, many of the trucks shipping to and from the ATC are owned by 3PL air freight forwarders (i.e., third party logistics providers who ship a company's goods) who primarily use Class 6 and 7 trucks. For both integrated and 3PL carriers, in general, at least one of their trips to and from the ATC is empty; though all carriers do their best to load up as much cargo in each part of their trips.

How does the Airtrans Taxiway Project Reduce Transportation Costs for Oregon Businesses?

Oregon businesses are directly dependent on the Airtrans facilities to move raw materials and finished products quickly, cost-effectively, and in most instances, air represents the only feasible means of shipment.

In fact, moving air cargo goods to other modes including, truck, rail, and marine modes, is infeasible due to the distances involved, quick shipping times, lack of connections to the domestic and international markets served, and the handling requirements (e.g., with perishable or fragile products) of air cargo shipments.

In other words, without the reliable functionality of PDX's air cargo processes at the Airtrans facility, air cargo would divert to other airports that serve the destinations that Airtrans does, such as SeaTac Airport, Boeing Field, San Francisco International Airport, Oakland Airport, and Boise Airport. Diverting air cargo to these airports would occur by truck which would result in longer travel times with much higher

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transportation costs to and from Oregon business warehouses, manufacturing plants, and local area hubs and terminals. These added costs could significantly reduce the Oregon workforce.

Amount of Air Cargo that would Divert from Airtrans Facility

As described in the *Transportation Capacity Analysis Technical Memorandum* by DKS and provided as supporting documentation to the answer provided to Question 22 in the ATC ConnectOregon grant application, the proposed "additional parking space (at the ATC facility) would have an annual capacity increase of 10,486 metric tonnes enplaned and deplaned (+3.85 percent)." This equates to being able to accommodate approximately sixty-eight more flights/month or 816 more flights/year.

As this is an average rate of growth based on current conditions, DKS sought to provide a range of growth using a high growth scenario. Initially for this scenario, it was assumed that there would be two round trip flights/day of an aircraft with the largest hold capacity that was fully (100%) loaded with cargo when enplaning and then fully loaded when deplaning. Under this scenario, the growth rate would be 33%, which seemed unreasonably high, and highly unlikely.

Another scenario considered the assumption that the flights are only 25% full when enplaning and deplaning, which results in a slightly more reasonable 8.35% growth rate (resulting in 21,170 metric tonnes of air cargo accommodated/year). While there is no available data about the average weight or usage of aircraft payload area capacity from industry or official sources such as the Federal Aviation Administration (FAA) or the USDOT Bureau of Transportation Statistics (BTS), team members discussed this % full/empty variable with logistics providers who agreed that anecdotally, it is a reasonable estimate.

In summary, the resulting metric tonnes air cargo for the average growth rate and the high growth rate scenarios is shown in Table 2.

Table 2. Air Cargo Weight Estimates Under Average and High Growth Rate Scenarios

Growth Rate Scenario	Annual Metric Tonnes	Annual Short Tons
Average (3.85%)	10,486	11,559
High (8.35%)	21,170	23,336

One metric tonne = 1.102311 short tons

Converting Air Cargo Tonnage to Truck Trips

Using the projected air cargo weight that can be accommodated by the proposed project and the maximum capacities of the trucks draying to and from the ATC, it is possible to estimate the number of truck trips required to move the additional air cargo that would be accommodated by the new ATC facility parking space.

As discussed earlier, SGA has discussed the types of trucks and their estimated payloads that ship air cargo to and from the ATC facility, and based on those discussions are assuming the following for the truck operations analysis:

- Fifty percent of all truck trips to and from the ATC are Class 7 trucks, 35% are Class 6 trucks, and 15% are Class 8 trucks. This is based on FedEx and UPS being the only carriers using Class 8 trucks, and most truck deliveries being of other commodities which use For Hire carriers using Class 6 and 7 trucks.
- One of the truck trips to or from the ATC facility is empty, while the other is less-than-truckload (and average 25% full).

As shown in Table 3, using these assumptions, an estimated 1,455 to 2,925 additional truck trips/year would be accommodated and arrive and depart the ATC facility with the proposed new parking space in operation.

Table 3. Converting Air Cargo to Truck Trips (*Annually*)

Growth Rate Scenario	Class 6 Trucks	Class 7 Trucks	Class 8 Trucks	Total
Average	725	510	220	1,455
High	1,465	1,025	440	2,925

Routes and Distances that would be used for Diverted Airtrans Cargo

If the proposed ATC parking space project is not built, the estimated number of truck trips shown in Table 3 would be forced to divert to other airports – i.e., SeaTac Airport, Boeing Field, San Francisco International, Oakland Airport, and Boise Airport. These results are shown in Table 4.

The results are based on truck origin and destination trip travel patterns produced by the Replica model, and the team's understanding of the geographic location of those businesses and shippers that use the Airtrans complex, diversions to other airports have been identified, as shown in Figure 1. The truck origins and destinations of air cargo to ATC were also split up throughout freight Oregon "regions" developed by SGA. These "regions" were drawn based on SGA's understanding of the location of commodity and supplier facilities locations.

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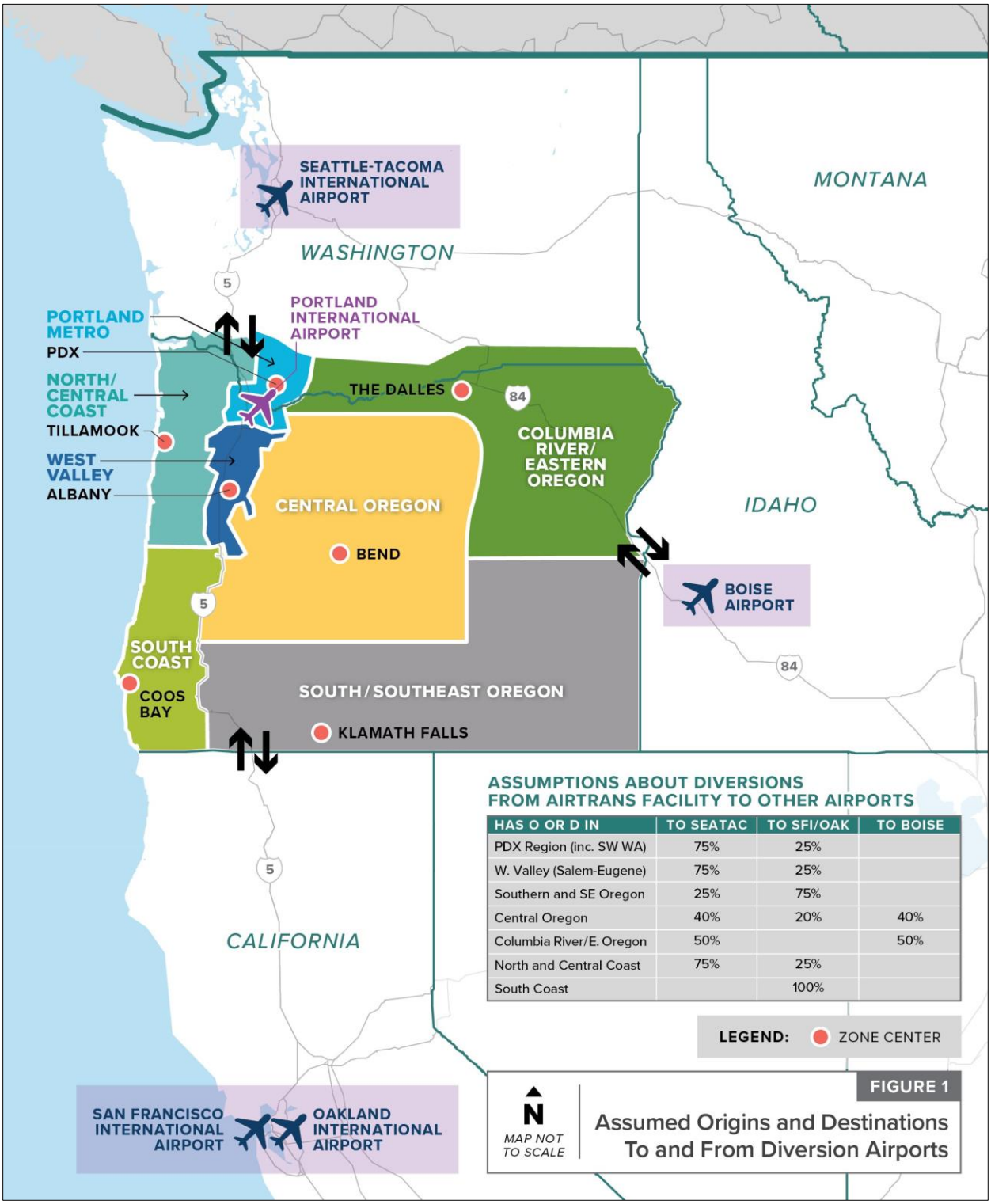

ASSUMPTIONS ABOUT DIVERSIONS FROM AIRTRANS FACILITY TO OTHER AIRPORTS

HAS O OR D IN	TO SEATAC	TO SFI/OAK	TO BOISE
PDX Region (inc. SW WA)	75%	25%	
W. Valley (Salem-Eugene)	75%	25%	
Southern and SE Oregon	25%	75%	
Central Oregon	40%	20%	40%
Columbia River/E. Oregon	50%		50%
North and Central Coast	75%	25%	
South Coast		100%	

LEGEND: ZONE CENTER

N

MAP NOT TO SCALE

FIGURE 1

Assumed Origins and Destinations To and From Diversion Airports

Table 4. Estimated Truck Trips Diverted to and from other Airports (*Annually*)

Growth Rate Scenario	Diversions to SeaTac and Boeing Field	Diversions to SFI and Oakland Airports	Diversions to Boise Airport	Total
Average	980 (67%)	425 (29%)	50 (4%)	1,455
High	1,975 (67%)	850 (29%)	100 (4%)	2,925

(00%) – Percent of total

For example, given their proximity and the fact that they serve similar destinations to Airtrans, most air cargo would divert by truck to the Sea Tac Airport and Boeing Field. As shown in Table 5, the distance to and from those airports ranges from 166 to 521 miles (i.e., the distance is 160 miles one-way between Airtrans and Sea Tac Airport, but the added mileage is provided to account for many businesses located further south in the Willamette Valley, east toward the Columbia River Gorge, and west toward the Oregon coast).

Similarly, should the proposed ATC project not be built, a substantial amount of Airtrans cargo would divert to the San Francisco Bay area airports because of 1) the area's concentration of distribution and certain industry (e.g., high-technology products) businesses, 2) the significant range of air cargo services to desired markets, and 3) because of the closer proximity of businesses located in South- and South-Central Oregon to those airports. The mileage used to account for these diversions ranges from 366 to 676 miles one-way.

Finally, while there are not as many direct flights to the same destinations as those at the Airtrans facility, some air cargo shipments would be diverted to Boise Airport chiefly because of its proximity to Eastern and Central Oregon businesses.

As shown in Table 4, between 977 and 1,975 truck trips would divert and from SeaTac Airport and Boeing Field, between 421 and 849 to the San Francisco and Oakland airports, and between 51 and 102 to the Boise Airport.

Estimating Mileage by Diversions to and from Other Airports

The final step in working toward the total avoided truck mileage associated with the proposed ATC project was to estimate the distance in miles from these other airports to a central point in each of the Oregon "regions" displayed in Figure 1. The central point of each "region" is shown in the far-right column of Table 5, and mileages were calculated using *MapQuest*©.

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Using the estimated truck trip diversions shown in Table 4 and applying those diverted trips to the average distances travelled (as shown in Table 5), results in the mileage incurred by diverted truck trips to the five airports. As shown in Table 6, the total annual mileage due to diverted truck trips is 919,000 miles under the average growth scenario, and over 1.855 million under the high growth scenario.

Table 5. Estimated Round Trip Mileage between Oregon "Region" and Diversion Airports

From Oregon "Region"	To SeaTac/Boeing	To SFI/Oakland	To Boise	Central Point
PDX Region (inc. SW WA)	166	660		(PDX)
W. Valley (Salem-Eugene)	236	581		(Albany)
Southern/SE Oregon	444	366		(Klamath Falls)
Central Oregon	521	503	319	(Bend)
Columbia River	238		347	(The Dalles)
North/Central Coast	234	676		(Tillamook)
South Coast		538		(Coos Bay)

Table 6. Estimated Truck Mileage Incurred by Diversions to and from other Airports (*Annually*)

Growth Rate Scenario	Mileage Incurred with Diversions to SeaTac and Boeing Field	Mileage Incurred with Diversions to SFI and Oakland Airports	Mileage Incurred with Diversions to Boise Airport	Total
Average	397,000	488,000	34,000	919,000
High	803,000	984,000	68,000	1,855,000

Truck Operating Costs

For this analysis, the truck operating costs provided in the annual American Transportation Research Institute (ATRI) have been used to estimate the impact of the diversions on Oregon businesses' operations. The ATRI has been preparing these truck operating costs annually since the year 2013 and for the latest data, ATRI's 2022 encompasses "169,770 truck-tractors, 498,068 trailers, and over 13.6 billion vehicle miles traveled. The sample thus represents approximately 7 percent of all miles traveled by combination trucks during 2022.[2]"

The ATRI data is used by ODOT's Transportation Planning Analysis Unit (TPAU) to conduct its modeling and economic analyses of trucking in Oregon.

As shown below in Table 7, ATRI collects and aggregates the data collected through their surveys by vehicle-based costs and driver-based costs. While most of these costs have remained stable in the past decade, fuel costs, which represent nearly 50% of all vehicle-based costs jumped by 53.8% from 2021 to 2022.

[2] *An Analysis of the Operational Costs of Trucking: 2023 Update, ATRI* June 2023, page 11, https://truckingresearch.org/atri-research/operational-costs-of-trucking/

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Table 7. Truck Operating Costs

Vehicle based	Per Hr	Per Mi
Fuel Cost	$25.84	$0.64
Truck Trailer Lease or Purchase Payments	$13.37	$0.33
Repair and Maintenance	$7.89	$0.20
Truck Insurance Premiums	$3.57	$0.09
Permits and Licenses	$0.60	$0.02
Tires	$1.81	$0.05
Tolls	$1.14	$0.03
TOTAL	**$54.22**	**$1.34**
Driver based	Per Hr	Per Mi
Driver Wages	$29.20	$0.72
Driver Benefits	$7.37	$0.18
TOTAL	**$36.57**	**$0.91**
	$90.79	**$2.25**

Source: *An Analysis of the Operational Costs of Trucking: 2023 Update, ATRI* June 2023 https://truckingresearch.org/atri-research/operational-costs-of-truckin g/

Total Truck Operating Costs due to Diversions from the Airtrans Facility

With the ATRI truck operating cost of $2.25/mile and the estimated diverted truck mileage in Table 6, the resulting truck operating costs/year range between $2.07 million/year and $4.2 million/year (see Table 8).

As the proposed project would have an expected lifespan through the year 2045, a twenty-year projection of these annual costs was developed based on a 2.56% annual inflation rate[3], which is an average of the inflation rate experienced during the years 2013-2023. Also shown in Table 8, the cumulative transportation operating costs due to truck traffic diverted due to the constrained capacity at the ATC facility without the added one parking space is between $53.1 million and $107.2 million per year.

Table 8. Avoided Truck Operating Costs with the Proposed ATC Parking Space

Growth Rate Scenario	Year 2025 Annual Miles	Year 2025 Annual Operating Cost		20-year (2025-2045) Cumulative Miles	20-year (2025-2045) Cumulative Operating Cost
Average	919,000	$2,068,000		18,378,000	$53,134,000
High	1,855,000	$4,174,000		37,090,000	$107,236,000

[3] Inflation and discount rates have recently experienced dramatic shifts in the past few years. In 2021/2022 the discount rate estimated by the Federal Reserve Bank was 7.0%, and in its 2/2024 February economic forecast, the Fed now estimates it to be 3.1%. Given these rapidly changing rates, SGA is using a more conservative rate of 2.56% based on the average of the past decade's actual rates.

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How does the Airtrans Taxiway Project improve access to jobs and sources of labor?

The Airtrans Taxiway grant will allow Portland shippers and businesses who already employ tens of thousands of workers in Oregon to continue to ship and receive essential products to and from far flung international and domestic suppliers and customers. Should the capacity of PDX's air cargo shipments be limited and result in unreliable service, many of these workers, who develop and assemble specialized technological and mechanical component parts, finished and piecemeal apparel, agricultural products, packages, consumer goods, and a wide variety of other shipments, will see their jobs moved to airports and regions outside of Oregon that can provide the needed air cargo service. Other employees will simply lose their jobs because their employers may be unable to absorb the added transportation costs associated with the air cargo being diverted to out-of-state airports.

Summary

In conclusion, the proposed project of adding one parking space at the ATC facility would significantly reduce truck operating costs for Oregon shippers and businesses. In fact, without the project, the added costs associated with diversion to other airports could be so great for carriers, especially 3PL carriers, that those carriers, as well as the businesses they serve who may have to absorb those high costs, may elect to move their operations closer to those airports (and, possibly outside of the State of Oregon) or close their businesses altogether.

With a total project cost of $6.0 million, and avoided transportation operating expenses exceeding $53 million, the project benefits related *solely* to transportation operations outweigh the project's cost by a ratio of nearly 9:1.

The proposed Airtrans Air Cargo Expansion project saves Oregon businesses money, allows them to expand their operations and hire additional employees, and continue to reach global and domestic markets.

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