

Natural Gas for Transportation

PRELIMINARY REPORT | JULY 2025

Aline Meysonnat, research analyst
Pete van Moorsel, tax review coordinator; Eric Thomas, legislative auditor

Legislative Auditor's conclusion

Three preferences reduce the cost of using natural gas as a transportation fuel. However, the emissions reduction objective for the preferences is not met.

Key points

- The Legislature passed four tax preferences to support the use of natural gas as a transportation fuel.
- The preferences aim to provide uniform tax treatment to sellers of natural gas, reduce emissions, promote economic development, and lower fuel costs.
- Two preferences meet legislative intent to provide uniform tax treatment for natural gas. A Department of Revenue work group will make recommendations about taxation of liquefied natural gas as a marine fuel by December 2025.
- The preferences met the economic development objective by lowering the cost to build a liquefied natural gas plant. The status of the employment objective is not disclosable.
- The emissions reduction objective of the tax preference is not met: Use of natural gas as a transportation fuel is less than originally anticipated. State ferries did not convert to liquefied natural gas, and on-road use of natural gas remains limited.

About this preference

Estimated savings: \$5.1m-\$19.2m	Tax type: Multiple taxes	Expiration date: One preference: July 2028 Two preferences: No expiration date.
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Executive summary

Joint Legislative Audit and Review Committee (JLARC) reviewed three preferences that support the manufacture and sale of natural gas as a transportation fuel

In 2014, the Legislature enacted four preferences that support the manufacture and sale of natural gas as a transportation fuel:

- A public utility tax (PUT) exemption for natural gas used as a transportation fuel.
- An exemption from the state and local natural gas use tax if the consumer uses the gas for transportation fuel.
- A sales tax exemption for liquefied natural gas for certain marine uses.
- A sales and use tax exemption for purchases by a gas utility of machinery and equipment used to manufacture compressed or liquefied natural gas as a transportation fuel.



JLARC reviewed three of them. The fourth preference was omitted from JLARC's review. JLARC is statutorily prohibited from evaluating exemptions for sales of machinery and equipment for manufacturing, R&D, or testing.

In 2019, the Legislature also created a PUT exemption for renewable gas for all uses, including transportation. It is not a part of this JLARC review.

Beneficiaries of the preferences are projected to save an estimated \$5.1 million to \$19.2 million total in the 2027-29 biennium

Public data indicates the beneficiaries of the preferences are Puget Sound Energy (PSE), TOTE Maritime Alaska (TOTE), and other buyers of natural gas used as a transportation fuel.

- In years that beneficiaries claim the machinery and equipment exemption, they must submit an annual tax performance report. The report must include sales of compressed natural gas and liquefied natural gas as a transportation fuel.
- Beneficiaries of the PUT exemption are not required to submit an annual tax performance report and disclose such sales.
- JLARC staff requested data about liquefied natural gas production, sales, and consumption to estimate tax savings for the PUT exemption and the sales tax exemption.
- JLARC staff did not receive permission from all beneficiaries to disclose tax savings. Staff instead relied on public data to estimate a range of beneficiary savings.
- Beneficiaries are estimated to save \$5.1 million to \$19.2 million total in the 2027-29 biennium.

Figure 1: Beneficiaries estimated to save \$5.1 million to 19.2 million in the 2027-29 biennium

Dollars in millions

Fiscal Year	Public Utility	Sales Tax	Natural Gas	Sales and Use	Total
	Tax Exemption: Natural Gas for Transportation	Exemption: Marine LNG	Use Tax Exemption: CNG, LNG for Transportation	Tax Exemption: M&E for CNG and LNG Manufacturing	
FY28	\$0.6 — \$2.6	\$1.5 — \$6.50	\$0.5	\$0	\$2.5 — \$9.6
FY29	\$0.6 — \$2.6	\$1.5 — \$6.50	\$0.5	\$0	\$2.5 — \$9.6

Fiscal Year	Public Utility	Sales Tax	Natural Gas	Sales and Use	Total
	Tax Exemption:	Exemption:	Use Tax	Tax Exemption:	
	Natural Gas for	Marine LNG	Exemption:	M&E for CNG	
	Transportation		CNG, LNG for	and LNG	
			Transportation	Manufacturing	
2027-29 biennium	\$1.2 — \$5.3	\$2.9 — \$13.0	\$0.9	\$0	\$5.1 — \$19.2

Note: Sum may not equal the total shown due to rounding.

Source: JLARC staff analysis of Department of Energy (DOE) data.

Beneficiaries of the machinery and equipment sales and use tax exemption must report compressed natural gas and liquefied natural gas sales in years they use this exemption. However, no beneficiary has used the preference since 2021. Requiring beneficiaries of the PUT exemption to report the amount of compressed natural gas and liquefied natural gas sold for use as transportation fuel would facilitate future reviews of the tax preferences.

Two preferences provide uniform tax treatment for sellers of natural gas

The Legislature's intent is to give uniform tax treatment of natural gas as a transportation fuel regardless of the seller. By providing both the PUT and the natural gas use tax exemptions, the preferences meet that intent.

The sales tax exemption does not provide uniform tax treatment of natural gas compared to other marine fuels

The partial sales tax exemption does not provide uniform tax treatment for liquefied natural gas compared to other marine fuels, such as diesel.

Diesel used in marine interstate commerce is fully exempt from sales tax, while the exemption for liquefied natural gas is limited to 90%. When the partial liquefied natural gas exemption expires in July 2028, its use will be subject to sales tax.

The Legislature directed the Department of Revenue (DOR) to convene a work group to review the taxation of liquefied natural gas as a marine fuel. DOR must make a recommendation by December 1, 2025.

Tax preferences met one of the four tax preference objectives

Figure 2: Tax preferences met one of four objectives

Objective	Target	Results
Estimated cost to build and equip liquefied natural gas facility.	\$250 million.	Met. The facility cost between \$366-\$489 million.

Objective	Target	Results
Number of employment positions and wages at a Washington liquefied natural gas facility. Facility must be run by a gas utility that sells liquefied natural gas as transportation fuel.	18 jobs at liquefied natural gas facility. Average wages at least \$35,000 per year.	Not disclosable. PSE did not give JLARC staff permission to disclose the information.
Estimated fuel savings by Washington State Ferries & other public entities using liquefied natural gas bought from a gas utility.	No stated target.	Not met. Washington State Ferries' vessels do not run on liquefied natural gas. PSE told JLARC staff that it had no liquefied natural gas sales to public entities.
Estimated reduction in CO ₂ , SO ₂ , NO ₂ , and particulate matter (PM) from use of compressed natural gas and liquefied natural gas as transportation fuel compared to diesel.	300 million pounds of CO ₂ . 200,000 pounds of PM. 400,000 pounds of SO ₂ . 450,000 pounds of NO ₂ .	Not met except for NO ₂ target.

Source: JLARC staff analysis.

Legislative Auditor's recommendations

If the legislative intent continues to be to support the use of natural gas as a transportation fuel, the Legislative Auditor makes three recommendations.

1. **Continue** the PUT and natural gas use tax exemptions to ensure uniform taxation of natural gas as a transportation fuel regardless of the seller.
2. **Continue** the sales tax exemption for liquefied natural gas in interstate commerce. In determining the level of benefit, the Legislature should consider recommendations from DOR's work group on taxation of marine use of liquefied natural gas.
3. **Modify** the PUT exemption to require beneficiaries to report the amount of compressed natural gas and liquefied natural gas produced and sold. This information would facilitate future reviews.

You can find additional information in the [Recommendations section](#).

Commission recommendation

To be included in proposed final report.

Part 1.

Tax preferences

In 2014, the Legislature enacted four tax preferences that support the sale and manufacture of nonrenewable natural gas for transportation. This includes both compressed natural gas and liquefied natural gas.

- Compressed natural gas is natural gas that is compressed and stored as gas. It can be used to fuel cars, trucks, and commercial vehicles.
- Liquefied natural gas is natural gas that is cooled and stored as a liquid. It can be used to fuel vehicles, trucks, and marine vessels.

In 2019, the Legislature also created a PUT exemption for renewable gas for all uses, including transportation. It is not a part of this JLARC review.

Legislature intended the preferences to provide uniform tax treatment of natural gas and to meet established objectives

When enacting the preferences, the Legislature stated the following:

- Construction and operation of a natural gas liquefaction plant and refueling stations, and ongoing use of natural gas, will lead to:
 - Positive job creation.
 - Economic development.
 - Environmental benefits.
 - Lower fuel costs.
- It is sound tax policy to give uniform tax treatment of natural gas as transportation fuel regardless of the seller.

The preferences have a common tax preference performance statement which states the Legislature's public policy objectives:

1. Promote job creation and positive economic development.
2. Lower carbon dioxide, sulfur dioxide, nitrogen dioxide, and particulate emissions.
3. Secure optimal liquefied natural gas pricing for the State of Washington and other public entities.

Legislature set performance metrics for the preferences

The Legislature directed JLARC to evaluate performance metrics for the preferences.

- The estimated total cost of construction of a liquefaction plant by a gas utility, including costs for machinery and equipment.
- The number of employment positions and wages at a natural gas liquefaction facility in Washington. The facility must be operated by a gas utility that sells or uses some or all of the liquefied natural gas as transportation fuel.
- The estimated fuel savings by Washington State Ferries and other public entities using liquefied natural gas bought from a gas utility.
- The estimated reduction in CO₂, SO₂, NO₂, and particulate emissions resulting from the use of natural gas as a transportation fuel compared to an equivalent amount of diesel. The natural gas must be sold by a gas utility.

The Legislature also established targets for those metrics. [Part 5](#) has more information about the specific targets and results.

JLARC staff reviewed three of the four preferences

JLARC staff reviewed three of the four preferences that benefit the manufacture and sale of natural gas as a transportation fuel.

Figure 3: Three preferences reduce the cost of using natural gas as a transportation fuel

Tax Type	Preference Description	Expiration	Beneficiaries
Public utility tax (PUT) (Part 2)	<p>Sales of the following are exempt from public utility tax and are subject to business and occupation (B&O) tax instead:</p> <ul style="list-style-type: none"> • Compressed natural gas or liquefied natural gas to be sold or used as transportation fuel. • Natural gas that will be manufactured into compressed natural gas or liquefied natural gas and sold or used as transportation fuel. 	None	Puget Sound Energy (PSE)
Brokered natural gas use tax (Part 3)	<p>Washington imposes a use tax on consumers of natural gas when the seller has not paid PUT. This preference exempts the use of natural gas as transportation fuel from that use tax.</p>	None	Users of natural gas as a transportation fuel from non-Washington utilities
Sales tax (Part 4)	<p>An exemption for 90% of the state and local sales tax on purchases of liquefied natural gas that is transported out of state via interstate marine commerce.</p>	July 1, 2028	TOTE Maritime Alaska (TOTE)

Source: JLARC staff analysis of Revised Code of Washington (RCW), other public data sources.

State law precludes one preference from JLARC review

One preference exempts purchases of machinery and equipment by a gas utility. The equipment used to manufacture compressed natural gas and liquefied natural gas as transportation fuel is exempt from sales and use tax. The preference expires July 1, 2028.

Statute requires the Citizen Commission for Performance Measurement of Tax Preferences to omit certain tax preferences from its scheduled performance reviews. This is the case for sales and use tax exemptions for machinery and equipment for manufacturing, research and development, or testing.

As a result, this preference is not part of JLARC's review. However, JLARC staff did review use of the preference to evaluate the Legislature's objective of reducing the cost to build and equip a liquefied natural gas facility.

When the Legislature considered the 2014 legislation that would create the tax preferences, PSE testified in favor. PSE cited its plan to construct a natural gas liquefaction plant in the Port of Tacoma. PSE built the plant, which became fully operational in 2022.

- In annual tax performance reports, PSE reported saving an estimated \$25 million in state and local sales tax during 2020 and 2021. This is equivalent to an estimated \$250 million in machinery and equipment purchases. No other businesses have reported use of this preference.
- Beneficiaries must file an annual tax performance report and disclose how much compressed natural gas and liquefied natural gas they sell only in years that they claim the preference. Beneficiaries reported no sales in 2020 and 2021.
- Public documents indicate the cost to construct and equip the plant was at least \$366 million.

Part 2.

PUT exemption

Like other public service businesses, natural gas utilities' gross earnings are subject to public utility tax (PUT). Amounts subject to PUT are not subject to business and occupation (B&O) tax.

The preference provides a PUT exemption for natural gas utilities that sell:

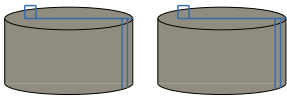
- Compressed natural gas or liquefied natural gas that will be sold or used as transportation fuel.
- Natural gas that will be converted into compressed natural gas or liquefied natural gas and sold or used as transportation fuel.

Consumers can use compressed or liquefied natural gas as a transportation fuel for cars, trucks, commercial vehicles, or marine vessels.

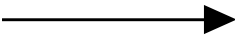
Figure 4: The tax preference exempts sales of natural gas used as a transportation fuel from PUT

Utility does not pay public utility tax

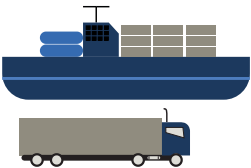
Utility manufactures transportation fuel from natural gas



Utility sells natural gas for transportation



Consumers use natural gas as a transportation fuel



Source: JLARC staff analysis of RCW 82.16.310.

The preference has no expiration date.

PUT exemption reduces the cost to manufacture compressed natural gas or liquefied natural gas for use as transportation fuel

Although sales of compressed natural gas and liquefied natural gas as a transportation fuel are exempt from PUT, they are instead subject to B&O tax. Tax savings is the difference between the PUT and B&O tax rates as shown in Figure 5, multiplied by the gross earnings of such sales. Gross earnings are a function of the amount of compressed or liquefied natural gas sold and its selling price.

Figure 5: Tax savings rate is the difference between PUT and B&O tax rates

Tax Program	Tax Rate
Public utility tax (gas distribution businesses)	3.852%
Business & occupation tax (manufacturing)	0.484%
Difference (tax savings)	3.368%

Source: JLARC staff analysis of RCW 82.16.020, RCW 82.02.030 and RCW 82.04.240.

JLARC staff estimate PUT exemption will save beneficiaries \$1.2 million — \$5.3 million in 2027-2029 biennium

Based on public information, it appears the primary beneficiary of this preference is PSE. PSE is an energy utility company that provides electrical power and natural gas to the Puget Sound region. It runs a natural gas liquefaction plant in the Port of Tacoma.

PSE manufactures liquefied natural gas at its Tacoma plant and sells it to TOTE Maritime Alaska (TOTE) for use in its vessels (see [Part 4](#) for more on TOTE). This activity appears to qualify for the PUT exemption.

JLARC staff did not find other natural gas utilities besides PSE that perform this activity and may benefit from this tax preference.

JLARC staff did not receive PSE's authorization to disclose the tax savings associated with this activity. Instead, JLARC staff estimated the PUT savings based on publicly available data. The data informs the staff estimate of the

volume and price of liquefied natural gas manufactured and sold to TOTE as a transportation fuel (for data sources see [Appendix A](#)).

Figure 6: PUT exemption will save beneficiaries \$1.2 million to \$5.3 million in the 2027-2029 biennium

Beneficiary Savings:						
Tax Rate Difference * LNG						
Sold * Price						
Fiscal Year	Tax Rate Difference	LNG Sold (in Millions of Btu)	Price (Low)	Price (High)	Savings (Low)	Savings (High)
FY28 and 29	3.368%	2,927,000 MMBtu	\$6.05	\$26.79	\$0.6 million	\$2.6 million
2027-29 biennium					\$1.2m	\$5.3m

Note: Fuel sold is 37.9 million gallons with an energy content of 2.9 million MMBtu. To standardize the measurement of liquefied natural gas volume from different sources, JLARC staff converted liquefied natural gas volume to its energy content in millions of British thermal units (MMBtu). One Btu is defined as the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit. Sum may not equal the total shown due to rounding.

Source: JLARC staff analysis of Tacoma LNG Environmental Impact Statement, Department of Energy (DOE) data.

Part 3.

Brokered natural gas use tax exemption

The preference is an exemption from state and local brokered natural gas use taxes. The exemption applies to the use of natural gas as transportation fuel.

Consumers pay state and local use taxes on the use of natural gas if the seller did not pay public utility tax

Washington state imposes brokered natural gas use taxes on the use of natural gas or manufactured gas by a consumer if:

- The consumer buys natural gas delivered through a pipeline from out of state, and
- The business that sold the gas to the consumer has not paid PUT on that sale.

The consumer pays the state and local brokered natural gas use tax. The rate is the same as the state and local public utility taxes. This ensures that consumers who buy brokered natural gas pay the same state and local taxes as those who purchase from in-state sellers.

Figure 7: Consumers pay state and local use taxes on the use of natural gas if the seller did not pay PUT

Tax Program	Tax Rate
State brokered natural gas use tax	3.852%
Average local brokered natural gas use tax	4.661%
Total	8.513%

Source: JLARC staff analysis of 82.12.022(6) and 82.14.230(6).

This preference exempts a consumer from paying brokered natural gas use tax when natural gas is used as a transportation fuel

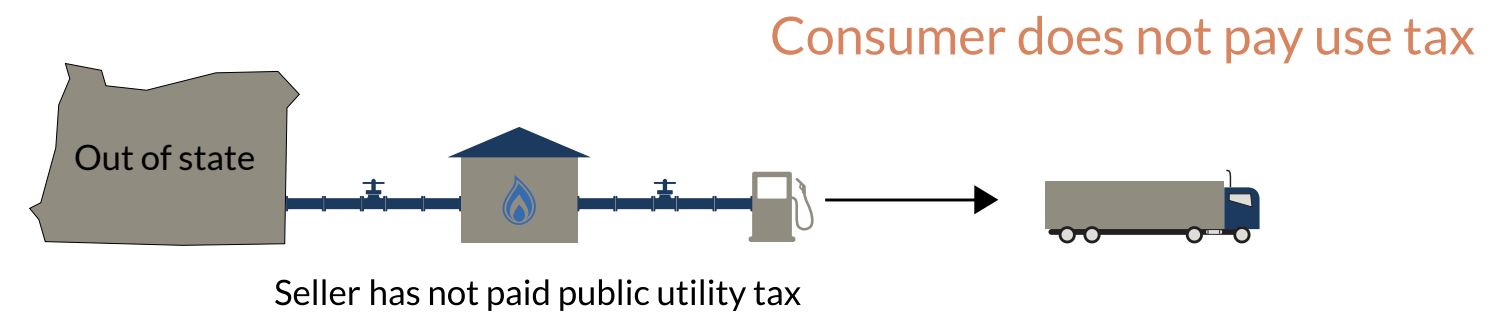
The preference provides an exemption to consumers who would otherwise pay the state and local brokered natural gas use taxes.

For example:

- A public university buys natural gas from an out-of-state source, through a broker, to fuel its work vehicles.
- An interstate pipeline delivers the natural gas to the local gas distribution system, who delivers it to the university. The seller did not pay PUT.
- Without the preference, the university would pay the state and local brokered natural gas use taxes.
- This preference exempts the university from paying those taxes.

The preference does not have an expiration date.

Figure 8: The tax preference exempts sales of natural gas delivered through a pipeline from out of state from the brokered natural gas use tax



Source: JLARC staff analysis of 82.12.022(6) and RCW 82.14.230(6).

Natural gas use tax exemption saves beneficiaries \$500,000 per year

The beneficiaries of this preference are individuals or businesses who:

- Use natural gas as a transportation fuel.
- Buy it from a seller other than a Washington gas utility.

The use of this exemption is not reported on tax returns submitted to DOR. JLARC staff estimated the savings attributable to this tax preference based on publicly available data.

JLARC staff estimated savings using the Energy Information Administration's data on the amount of natural gas used as a vehicle fuel. Staff also used public data for the price of liquefied natural gas at the pump (see [Appendix A](#) for details).

- In 2024, the natural gas used as a transportation fuel in on-road applications had an energy content equivalent to 1.5 million gallons of diesel (DGE).
- In 2024, the average liquefied natural gas price was \$3.68 for an amount of liquefied natural gas with an energy content equivalent to one gallon of diesel.

Figure 9: Natural gas use tax exemption saves beneficiaries \$500,000 per year

Fiscal Year	Tax Rate	LNG Sold (in Million Gallons of Diesel Equivalent)	Price of LNG at the Pump	Natural Gas Use Tax Exemption: LNG or CNG for Transportation
FY28 and 29	8.513%	1.5	\$3.68	\$0.5m
2027-29 biennium				\$0.9m

Note: To standardize units of measurement, JLARC staff converted volumes of liquefied natural gas into energy contents, then converted those to diesel gallon equivalent (DGE). Sum may not equal the total shown due to rounding.

Source: JLARC staff analysis of DOE data.

Part 4.

Sales tax exemption

Washington state imposes state and local sales tax on purchases of tangible personal property. This includes purchases of fuel such as liquefied natural gas and diesel used in interstate commerce. Figure 10 shows the state and local sales tax rates in Tacoma, where PSE's liquefied natural gas plant is located.

Figure 10: Without the exemption, shipping businesses engaged in interstate or foreign commerce pay a total of 10.3% in sales tax on their purchases of liquefied natural gas

Tax Program

Tax Rate

State sales tax	6.5%
Local sales tax, Tacoma	3.8%
Total	10.3%

Source: JLARC staff analysis of 82.08.020 and local sales and use tax information provided by DOR.

This preference provides an exemption for 90% of the state and local sales tax on purchases of liquefied natural gas that shipping businesses transport in interstate marine commerce. Liquefied natural gas consumed in Washington remains subject to tax. For example:

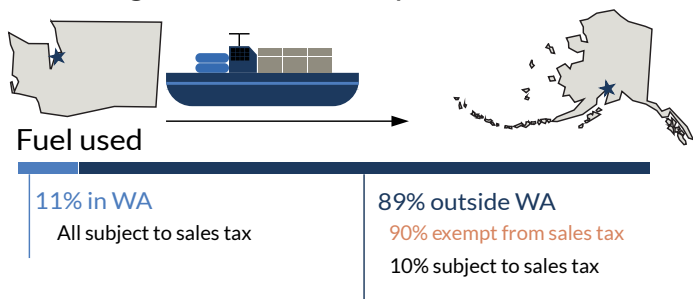
- A shipping business purchases liquefied natural gas and transports it out of state for use in interstate marine commerce.
- The liquefied natural gas that a shipping business uses within Washington is subject to sales tax.
- The shipping business may claim a 90% sales tax exemption on the portion used outside of Washington.

JLARC staff estimate that, on a trip between Tacoma and Anchorage, a shipping business uses 11% of fuel within Washington and 89% outside of Washington.

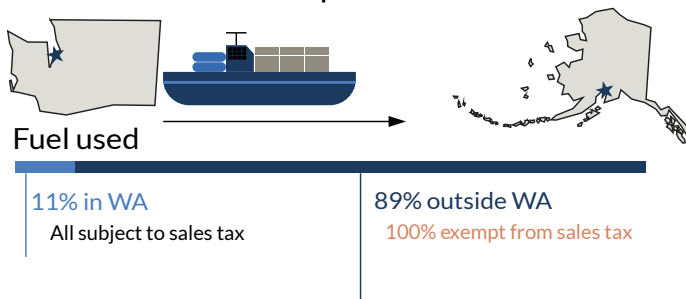
- For natural gas:
 - **Share consumed in state:** subject to sales tax.
 - **Share consumed out of state:** 90% exempt, 10% subject to sales tax.
- For diesel:
 - **Share consumed in state:** subject to sales tax.
 - **Share consumed out of state:** 100% exempt.

Figure 11: Taxation of liquefied natural gas and diesel depends on where it is consumed

Natural gas sales tax exemption



Diesel sales tax exemption



Source: JLARC analysis of RCW 82.08.0261(2,3).

The exemption expires July 1, 2028.

Sales tax exemption will save beneficiaries between \$2.9 million and \$13 million in the 2027-2029 biennium

The main beneficiary is TOTE Maritime Alaska (TOTE), a cargo shipping company operating between the Port of Tacoma and Anchorage.

Representatives of TOTE also testified in favor of the 2014 legislation that created the preferences. TOTE confirmed it fuels its two vessels with liquefied natural gas purchased from PSE in Tacoma. TOTE is the sole known beneficiary of the sales tax exemption for liquefied natural gas as a transportation fuel.

- TOTE authorized JLARC to disclose the amount of liquefied natural gas it consumes and the tax it saves.
- However, the amount of tax savings could potentially be used to estimate PSE's tax savings due to the PUT exemption. JLARC staff did not receive PSE's authorization to disclose this amount.
- Instead, JLARC staff estimated the sales tax savings based on publicly available data. This data describes the volume and price of liquefied natural gas that TOTE's marine vessels use on their trip from Tacoma to Anchorage (see [Appendix A](#)).

Figure 12: Sales tax exemption will save TOTE \$2.9 million — \$13 million in the 2027-2029 biennium

Beneficiary Savings:							
Tax Rate * LNG consumed							
outside WA *90% * Price							
Fiscal	Tax	LNG bought (in	LNG used	Price	Price	Savings	Savings
Year	Rate	Millions of Btu)	outside of WA	(Low)	(High)	(Low)	(High)
			(89%)				
FY28 and 29	10.3%	2,927,000 MMBtu	2,605,030 MMBtu	\$6.05	\$26.79	\$1.5 million	\$6.5 million
2027-29						\$2.9m	\$13m
biennium							

Note: Fuel consumed by TOTE is 37.9 million gallons with an energy content of 2.9 million MMBtu. Sum may not equal the total shown due to rounding.

Source: JLARC staff analysis of Tacoma LNG Environmental Impact Statement, DOE data.

Partial sales tax exemption does not provide uniform tax treatment for liquefied natural gas when compared to other marine fuels

The partial sales tax exemption may not be providing uniform tax treatment for liquefied natural gas when compared to other marine fuels, such as diesel.

Diesel used in marine interstate commerce is fully exempt from sales tax, while the exemption for liquefied natural gas is limited to 90%. The tax revenue from the 10% that is not exempt goes to the Motor Vehicle Fund. The Legislature stated the purpose of the narrower exemption was to support Washington State Ferries and state highway system needs.

When the partial liquefied natural gas exemption expires July 1, 2028, its use will be subject to sales tax. Diesel used in marine interstate commerce will remain fully exempt from sales tax.

Part 5.

Objectives

The Legislature directed JLARC to evaluate four performance metrics related to the preferences' economic and environmental benefits. The Legislature established targets for three of the metrics.

Figure 13: The Legislature established four performance metrics with targets for the preferences

Objective	Target(s)
The estimated total cost for a gas utility to build a natural gas liquefaction plant, including costs for machinery and equipment.	\$250 million.
The number of employment positions and wages at a natural gas liquefaction plant in Washington. The plant must be run by a gas utility that sells or uses some or all of the liquefied natural gas as transportation fuel.	18 jobs at liquefied natural gas facility. Average wages of at least \$35,000 per year.
The estimated fuel savings by Washington State Ferries and other public entities that use liquefied natural gas purchased from a gas utility.	No stated target.
The estimated reduction in CO ₂ , SO ₂ , NO ₂ , and particulate emissions (PM) resulting from the use of compressed or liquefied natural gas as a transportation fuel, when compared to an equivalent amount of diesel. The natural gas must be sold by a gas utility.	300 million pounds of CO ₂ . 200,000 pounds of PM. 400,000 pounds of SO ₂ . 450,000 pounds of NO ₂ .

Source: JLARC staff analysis of RCW 82.38.030.

PSE's construction of a natural gas liquefaction plant met the economic development objective

PSE built the natural gas liquefaction plant in the Port of Tacoma during 2019-2021. Total construction costs of the Tacoma project were \$489 million. The Tacoma liquefied natural gas plant cost at least \$366 million. This meets the Legislature's economic target of \$250 million.

Status of employment and wages objective is not disclosable

JLARC cannot disclose employment and wage data for the liquefied natural gas plant without PSE's authorization. PSE did not grant that authorization.

Washington State Ferries does not use liquefied natural gas, and the fuel savings objective was not met

Washington State Ferries (WSF) is a division of the Washington State Department of Transportation (WSDOT). WSF does not operate any natural gas ferries. So WSF and other public entities do not have any estimated fuel savings through the use of liquefied natural gas bought from a gas utility.

JLARC staff confirmed with WSDOT that the agency does not use liquefied natural gas in any of its vessels or vehicles.

The Legislature directed the review to evaluate four pollutants for the emissions reduction objective

- **Carbon dioxide (CO₂)** – Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees, and other biological materials. It also enters the atmosphere as a result of certain chemical reactions (e.g., cement production).

Carbon dioxide is a greenhouse gas which retains heat in the atmosphere, contributing to global warming and negative environmental impacts.

- **Nitrogen dioxide (NO₂)** – Nitrogen dioxide is emitted during:
 - Agricultural, land use, and industrial activities.
 - Combustion of fossil fuels and solid waste.
 - Treatment of wastewater.

Nitrogen dioxide can be harmful to the human respiratory system and can form acid rain, which harms the environment.

- **Sulfur Dioxide (SO₂)** – The largest source of SO₂ in the atmosphere is the burning of fossil fuels by power plants and other industrial facilities.

Like nitrogen dioxide, SO₂ can be harmful to the human respiratory system and can form acid rain, which harms the environment.

- **Particulate matter (PM)** – Microscopic solids or liquid droplets. PM₁₀ denotes particles with diameters that are generally 10 micrometers or smaller.

Particles of this size are small enough that they can be inhaled and cause serious health problems.

The analysis in this report uses NO_x and SO_x to include other oxides of nitrogen and sulfur.

Use of natural gas as a transportation fuel did not meet emissions reduction objective

JLARC staff used publicly available data to evaluate the emissions reductions associated with the use of compressed natural gas and liquefied natural gas as a transportation fuel ([Appendix A](#)).

For the analysis, JLARC staff used the Greenhouse gases, Regulated Emissions, and Energy use in Technologies (GREET®) model and did the following:

- Estimated the amount of natural gas used as a transportation fuel in Washington.
- Used the GREET model to compare the estimated emissions associated with that amount of fuel to an equivalent amount of diesel.

The GREET model was developed by the U.S. Department of Energy. It is a tool that assesses energy, emissions, and environmental impact. A description of the model and the analysis is in [Appendix B](#). The analysis comprises two main uses of natural gas:

- Liquefied natural gas used as a marine fuel. The amount of this fuel was estimated in the final supplemental environmental impact statement for the Tacoma liquefied natural gas plant.
- Liquefied natural gas used to fuel on-road vehicles. The amount of this fuel is estimated by the federal Energy Information Administration.

Except for nitrogen dioxide (NO₂) the emissions targets have not been met (Figure 14). Generally, the greater the replacement of other petroleum-based fuels with liquefied natural gas, the greater the overall reductions in greenhouse gas emissions. The initial legislation assumed that WSF and other public entities would use liquefied natural gas. However, this did not happen, and actual liquefied natural gas consumption is lower than anticipated.

Figure 14: Three of four emissions reduction targets have not been met

Pollutant	Target Reduction (lbs.)	Reduction from Marine Use (lbs.)	Reduction from Vehicle Use (lbs.)	Total Reduction (lbs.)	% of Target
NO _x	450,000	8,663,000	13,000	8,676,000	1928%
PM ₁₀	200,000	115,000	1,000	116,000	58%
SO _x	400,000	271,000	(1,000)	270,000	68%
CO ₂	300,000,000	124,068,000	10,576,000	134,644,000	45%

Note: The GREET model and this report use NO_x and SO_x to include other oxides of nitrogen and sulfur. This analysis is based on assumed consumption for 2025. Values are rounded.

Source: JLARC staff analysis of environmental impact statement (EIS) data, GREET Model.

The emission reduction for NO_x is around 19 times more than the target set by the Legislature. It is unclear why the GREET model estimates emission reductions substantially exceeding the target.

JLARC staff interviewed personnel who are responsible for the GREET model. They suggested that while CO₂ and SO_x were well studied, PM₁₀ and NO_x are more dependent on the type of vessel, the engine used by the vessel,

and the trip undertaken.

Estimated reductions in the remaining pollutants did not meet the targets, falling between 45% and 68% of the target.

Two factors suggest why the emissions reduction targets were not met

- **Fewer ships and liquefied natural gas than originally anticipated:** When the preference was enacted, it was estimated that other ships would replace a further 30.15 million gallons of diesel used in marine vessels with 48.86 million gallons of liquefied natural gas per year. However, Washington State Ferries does not operate any natural gas ferries. JLARC staff estimated that the emissions reduction targets would have been met if other ships had converted to liquefied natural gas ([Appendix B](#)).
- **A limited number of vehicles registered in Washington run on natural gas:** In 2024, only 893 vehicles were powered by liquefied natural gas, and 248 ran on compressed natural gas. Most were commercial vehicles. In addition, Kent school district operates 21 school buses powered by compressed natural gas and Pierce Transit operates 119 transit buses powered by compressed natural gas.

Liquefied natural gas plant likely affects environmental factors for port workers and nearby residents

Environmental reviews of the liquefied natural gas facility in the Port of Tacoma considered several aspects of the project, including the following:

- Effects of the project on regional air quality.
- Effects of a potential spill of liquefied natural gas and impacts on human health and safety.

Race and ethnicity data for employees of the beneficiary businesses was not available. JLARC staff used census data to illustrate the race and ethnicity of two populations—port workers and residents near the liquefied natural gas plant. Based on their proximity to the plant, these populations would most likely be affected by positive impacts, such as improved air quality, and any negative impacts, such as a potential spill from the liquefied natural gas plant.

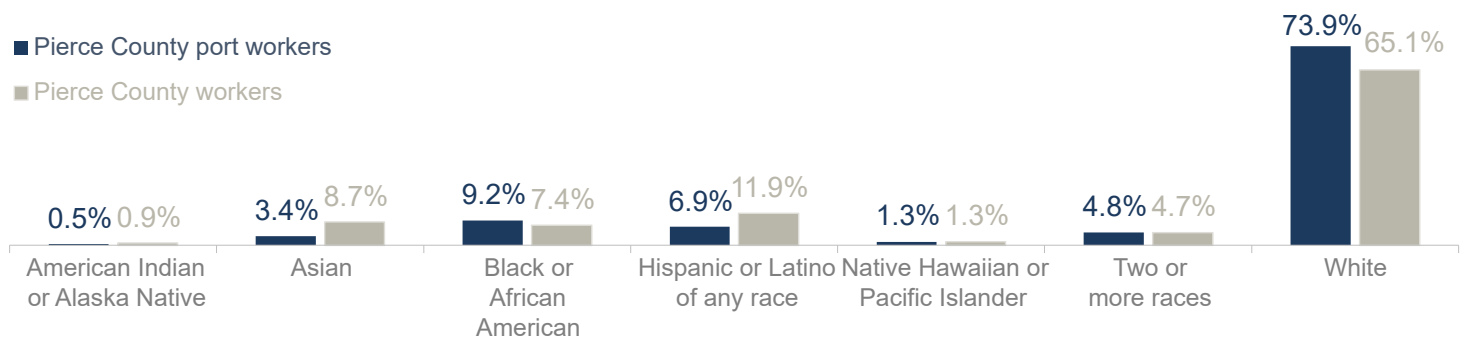
JLARC staff compiled estimated race and ethnicity data from the U.S. Census Bureau's Longitudinal Employer-Household Dynamics program for the "Support Activities for Water Transportation" industry classification. This subclassification of the transportation and warehousing industry sector includes businesses engaged in:

- Port and harbor operations.
- Marine cargo handling.
- Navigational services to shipping.
- Other support activities for water transportation.

Compared to Pierce County workers in all industries, the "Support Activities for Water Transportation" industry classification includes:

- A lower proportion of workers who are Hispanic/Latino or Asian.
- A higher proportion of workers who are Black or African American or white.

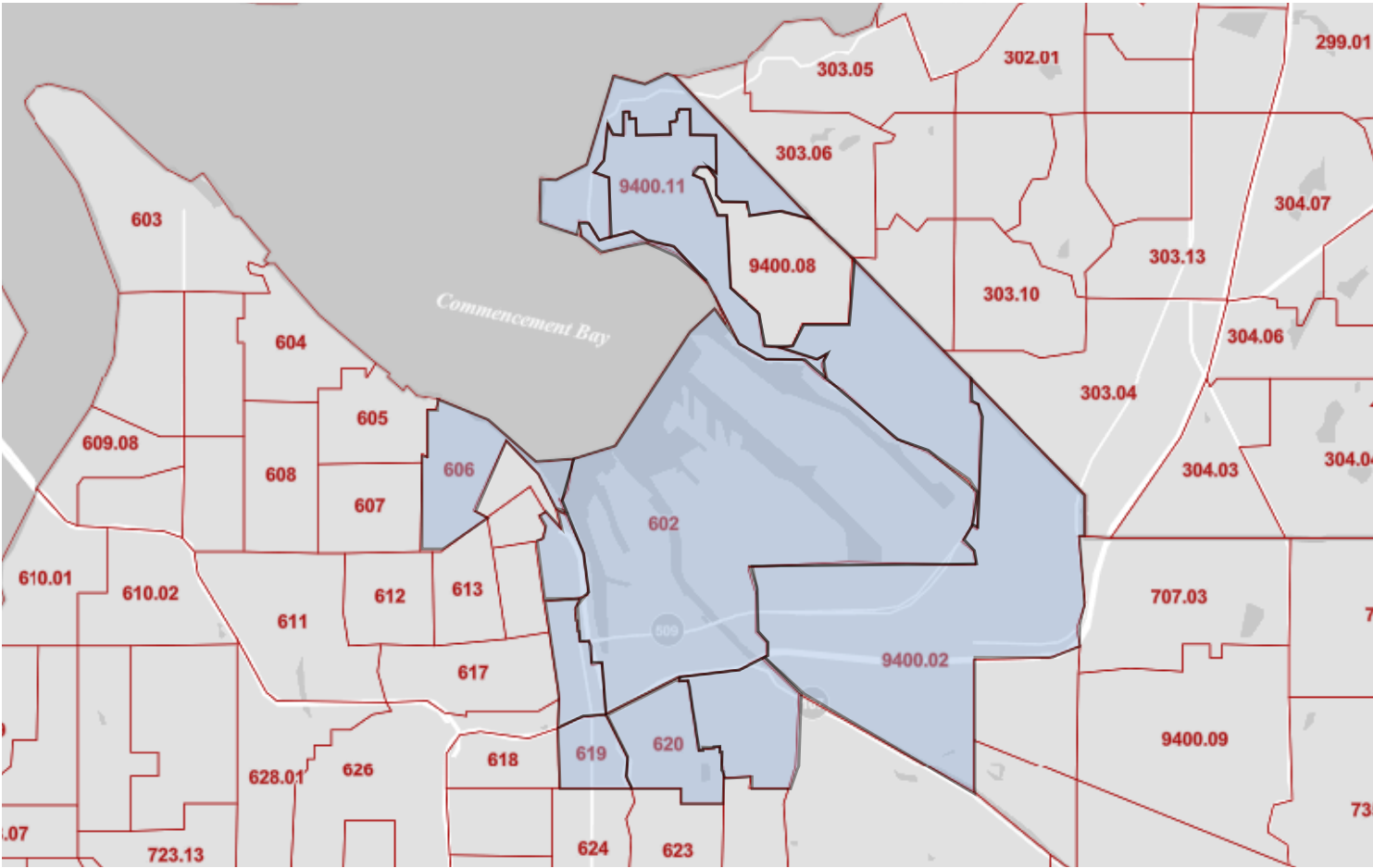
Figure 15: Census data describes race and ethnicity of port workers



Source: JLARC analysis of Longitudinal Employer-Household Dynamics (LEHD) data for NAICS 4883 — Support Activities for Water Transportation by Race and Ethnicity, Pierce County.

In addition to port workers, JLARC staff analyzed the racial and ethnic characteristics of residents of the census tracts around the liquefied natural gas plant. This includes residents living in the census tract that encompasses the Port of Tacoma and the immediately adjacent census tracts (as shown in Figure 16).

Figure 16: JLARC staff analyzed the racial make-up of residents of the census tracts around the liquefied natural gas plant in Tacoma



Source: JLARC staff analysis of U.S. Census Bureau data.

About 61% of residents living in this area are white, 13% are Hispanic or Latino, and 8% are Asian.

Figure 17: Similar to Pierce County, more than 60% of residents in the Port of Tacoma and surrounding census tracts are white

	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races	Hispanic or Latino
Port of Tacoma & Adjacent Tracts	61.4%	6.2%	1.3%	8.1%	1.1%	0.2%	9.0%	12.6%
Pierce County	62.5%	6.8%	0.7%	6.4%	1.5%	0.5%	9.1%	12.5%
Washington	64.3%	3.8%	0.8%	9.3%	0.7%	0.5%	6.5%	14.1%

Source: JLARC staff analysis of American Community Survey (ACS) 5-year estimates.

Part 6.

Department of Licensing and Department of Revenue studies

Legislature directed the Department of Licensing (DOL) and the Department of Revenue (DOR) to examine taxation of natural gas used as a transportation fuel

When it enacted the tax preferences, the Legislature directed DOL and DOR to convene work groups concerning taxation of natural gas as a transportation fuel.

DOL was tasked with:

- Evaluating the annual license fee in lieu of fuel tax.
- Developing a plan to transition vehicles powered by compressed or liquefied natural gas from the license fee to the fuel tax.

Instead of paying a fuel excise tax at the pump, owners of natural-gas-powered vehicles must pay an annual license fee based on the weight of their vehicle.

In 2016 DOL's work group recommended no change to the fee schedule and no transition to transportation-based tax.

DOL noted that:

- There were fewer than 1,400 natural gas or propane-powered vehicles subject to the fee in lieu of tax in Washington.
- Of these, 484 were natural gas powered.

DOR was directed to examine the appropriate level and manner of taxing liquefied natural gas used for marine vessel transportation. DOR must make recommendations to the fiscal committees of the Legislature by December 1, 2025.

As of February 2025, DOR reports it has not yet convened this work group.

Recommendations

If the legislative intent continues to be to support the use of natural gas as a transportation fuel, the Legislative Auditor makes three recommendations.

Recommendation #1:

Continue the PUT and natural gas use tax exemptions to ensure uniform taxation of natural gas as a transportation fuel regardless of the seller.

When enacting the preferences, the Legislature stated that it is sound tax policy to give uniform tax treatment of natural gas as a transportation fuel regardless of the seller. Continuing these preferences aligns with legislative findings:

- The PUT exemption ensures that natural gas as a transportation fuel is taxed the same regardless of the seller.
- The natural gas use tax exemption ensures that consumers who purchase brokered natural gas are exempt from the same state and local taxes as those who purchase from in-state sellers.

Legislation required: No

Fiscal impact: If the Legislature continues the preference, beneficiaries will continue to save \$1.2m-\$5.3 million for the PUT exemption and \$0.9 million for the natural gas use tax exemption in the 2027-29 biennium.

Implementation date: Not applicable

Recommendation #2:

Continue the sales tax exemption for liquefied natural gas in interstate commerce. In determining the level of benefit, the Legislature should consider recommendations from DOR's work group on taxation of marine use of liquefied natural gas.

The partial sales tax exemption does not provide uniform tax treatment for liquefied natural gas compared to other marine fuels, such as diesel. Diesel used in marine interstate commerce is fully exempt from sales tax, while the

exemption for liquefied natural gas is limited to 90%. When the partial liquefied natural gas exemption expires in July 2028, its use will become subject to sales tax. The Legislature directed the Department of Revenue (DOR) to convene a work group and make a recommendation about taxation of liquefied natural gas as a marine fuel by December 1, 2025.

Legislation required: Yes

Fiscal impact: Depends on Legislature's policy choice.

Implementation date: 2028 legislative session.

Recommendation #3:

Modify the PUT exemption to require beneficiaries to report the amounts of compressed natural gas and liquefied natural gas produced and sold. This information would facilitate future reviews.

Beneficiaries of the machinery and equipment exemption are required to report sales of compressed natural gas and liquefied natural gas as a transportation fuel in years they claim that exemption. There is no reporting requirement of such sales for beneficiaries of the PUT exemption. Requiring beneficiaries of the PUT exemption to report the amount of compressed natural gas and liquefied natural gas sold for use as transportation fuel would facilitate future reviews of the tax preferences.

Legislation required: Yes

Fiscal impact: None

Implementation date: At the Legislature's discretion.

Letter from commission chair

To be included in proposed final report.

Commission recommendation

To be included in proposed final report.

Current recommendation status

JLARC staff review whether the agency acted on the recommendation for four years. The first review typically happens about a year after we issue the report. The most recent responses from agencies and status of the recommendations in this report can be viewed on our [legislative auditor recommendations page](#).

Appendices

Appendix A: Data sources for fuel consumption and liquefied natural gas price | Appendix B: GREET analysis | Appendix C: Applicable statutes | Appendix D: Study questions & methods | Appendix E: Audit authority | Appendix F: Study Process

Appendix A: Data sources for fuel consumption and liquefied natural gas price

Fuel consumption for marine vessels and vehicles

To estimate fuel consumption for marine vessels and vehicles JLARC staff relied on several public sources:

- **Marine vessel fuel consumption:** JLARC staff relied on the environmental impact statements (EIS) for the liquefied natural gas plant to estimate liquefied natural gas fuel use for marine vessels. At the inception of the project of building a liquefied natural gas facility in the Port of Tacoma, the City of Tacoma initiated an environmental review of the Tacoma Liquefied Natural Gas Project. The environmental review was completed in 2015. A supplemental environmental review (SEIS) that included the effect of liquefied natural gas on upstream greenhouse gases was completed in 2019.
- **Vehicle fuel consumption:** The U.S. Energy Information Administration (EIA) publishes natural gas consumption by end use. JLARC staff used the natural gas consumption for vehicle use. Consumption is reported in million cubic feet which JLARC staff converted to an energy content in MMBtu first. This conversion was then used to calculate the same energy content for a diesel gallon equivalent (DGE).

Figure 18: Overview of preferences benefiting natural gas as a transportation fuel

Consumer	Marine Vessel Diesel	LNG	Source
TOTE	23.47 million gallons 3,014,000 MMBtu	37.9 million gallons 2,927,000 MMBtu	EIS (2015), SEIS (2019)
Other vessels	30.15 million gallons 2,927,000 MMBtu	48.86 million gallons 3,770,000 MMBtu	EIS (2015), SEIS (2019)
Vehicle Fuel Consumption	-	2021-2024 average: 1.5 million gallons DGE 206,682 MMBtu.	EIA Natural Gas Consumption by end use

Source: EIS (2015), SEIS (2019), EIA.

In addition to the amounts shown above, JLARC staff assumed that some marine diesel is used as a pilot fuel when operating the vessels fueled by liquefied natural gas. This is consistent with the assumptions of the environmental impact statement.

Price of liquefied natural gas

For marine use, JLARC staff used data published by EIA to estimate a range of prices for liquefied natural gas.

- **Price of liquefied natural gas exports (low):** The EIA publishes data on the price of liquefied natural gas exports in terms of dollars per thousand cubic feet (Mcf) which JLARC staff converted to million British thermal units (MMBtu). The price is the low end of the range because of the liquefied natural gas volume exported, whereas PSE has a smaller operation with a lower volume sold to TOTE.
- **Price of liquefied natural gas at the pump (high):** EIA's Alternative Fuels Data Center reports the price of liquefied natural gas at the pump. This is likely to be an over-estimate of the actual price PSE sells the liquefied natural gas to TOTE for their use in marine vessels.

For 2024, JLARC staff's liquefied natural gas price assumptions range between \$6.05 per MMBtu (low) and \$26.79 per MMBtu (high).

For vehicles, JLARC staff relied on fuel prices reported by the U.S. Department of Energy's Alternative Fuels Data Center. Prices are reported per gasoline gallon equivalent. These are converted to price per diesel gallon equivalent (DGE) using established conversion factors.

This yields an average liquefied natural gas price of \$3.68 per DGE in 2024. JLARC staff assumed it remains constant in the following years.

Appendix B: GREET analysis

To estimate the reduction in greenhouse gas emissions of compressed natural gas and liquefied natural gas compared with an equivalent amount of diesel fuel, JLARC staff used the Greenhouse gases, Regulated Emissions, and Energy use in Technologies (GREET®) life cycle assessment suite of models. GREET was developed by the U.S. Department of Energy's (DOE's) Argonne National Laboratory (ANL).

GREET is a tool that assesses a range of life cycle energy, emissions, and environmental impact challenges and that can be used to guide decision-making, research and development, and regulations related to transportation and the energy sector.

- **Marine vessels:** JLARC staff used the 2023 marine module developed by ANL. The module is intended to evaluate the environmental impact of various marine fuel production pathways including both fossil- and bio-derived marine fuels.
- **Vehicles:** JLARC staff used the GREET (2024) application to estimate emission factors for the pollutants that the Legislature is interested in. Emission factors consider the entire life cycle of the fuel used in vehicles.

JLARC staff multiplied the emission factors from GREET by the energy content for marine diesel, vehicle diesel, and liquefied natural gas. The difference between the results from marine diesel/vehicle diesel to liquefied natural gas is the reduction in emissions.

Figure 19: GREET model marine results

	TOTE Marine Diesel	TOTE LNG	TOTE Pilot Diesel	Other Vessels Marine Diesel	Other Vessels LNG	Other Vessels Pilot Diesel
Mgal per year	23.47	37.93	-	30.15	48.86	-

	TOTE Marine Diesel	TOTE LNG	TOTE Pilot Diesel	Other Vessels Marine Diesel	Other Vessels LNG	Other Vessels Pilot Diesel			
Energy content (MMBtu)	3,014,000	2,927,000	87,000	3,873,000	3,770,000	103,000			
	TOTE Marine Diesel	TOTE LNG	TOTE Pilot Diesel	Other Vessels Marine Diesel	Other Vessels LNG	Other Vessels Pilot Diesel	Emission Reduction TOTE	Emission Reduction Other Vessels	Total
NO_x (million lbs.)	10.68	1.71	0.31	13.73	2.20	0.37	8.66	11.16	19.82
PM₁₀ (million lbs.)	0.16	0.04	0.00	0.20	0.05	0.01	0.11	0.15	0.26
SO_x (million lbs.)	0.36	0.08	0.01	0.47	0.10	0.01	0.27	0.35	0.62
CO₂ (million lbs.)	587.46	446.44	16.96	754.89	575.01	20.08	124.07	159.80	283.87

Note: This analysis is based on assumed consumption for 2025.

Source: JLARC analysis of GREET model.

Figure 20: GREET model vehicle results

	Vehicles Diesel	Vehicles LNG	
DGE per year (million)		1.5	1.5
Energy content (MMBtu)		206,682	206,682
	Vehicles Diesel	Vehicles LNG	Reduction Vehicles
NO_x (million lbs.)	0.04	0.03	0.01

	Vehicles Diesel	Vehicles LNG	Reduction Vehicles
PM₁₀ (million lbs.)	0.00	0.00	0.00
SO_x (million lbs.)	0.00	0.01	(0.00)
CO₂ (million lbs.)	42.72	32.14	10.58

Note: This analysis is based on assumed consumption for 2025.

Source: JLARC analysis of GREET model.

Appendix C: Applicable statutes

RCW **43.136.045**: Schedule for review of tax preferences — Expedited review — Citizen input

RCW **82.04.310**: Exemptions — Public utilities — Electrical energy — Natural or manufactured gas

RCW **82.16.310**: Exemptions — Sales by a gas distribution business

RCW **82.08.0261**: Exemptions — Sales of personal property for use connected with private or common carriers in interstate or foreign commerce

RCW **39.42.150**: Liquefied natural gas used as marine vessel transportation fuel

RCW **82.12.022**: Natural or manufactured gas — Use tax imposed — Exemption

RCW **82.14.230**: Natural or manufactured gas — Cities may impose use tax

RCW **82.08.02565**: Exemptions — Sales of machinery and equipment for manufacturing, research and development, or a testing operation — Labor and services for installation

RCW **82.38.030**: Tax imposed — Rate — Incidence

RCW **82.32.900**: Work group created — Transition plan — Taxing liquefied natural gas used for marine vessel transportation.

Appendix D: Study questions

By law, tax preference reviews must address these study questions

Study questions define the scope of the audit. These reviews will consider the study questions as they relate to each preference, which were presented to JLARC in September 2024 ([view here](#)).

- **Public policy objectives:** What did the Legislature intend to accomplish? Has the preference achieved those goals?
 - The Legislature defined specific performance metrics for some tax preferences.
 - For others, JLARC staff infer objectives and metrics.
- **Beneficiaries:** Who does the preference benefit, either directly or indirectly? How much have they saved?

- **Revenue and economic impacts:** What are the impacts to the taxpayers and the state?
- **Other states:** Do other states have a similar tax preference?
- **Racial equity:** Are there racial equity considerations associated with the tax preferences?

Methods

The methodology JLARC staff use when conducting analyses is tailored to the scope of each study, but generally includes the following:

- **Interviews** with stakeholders, agency representatives, and other relevant organizations or individuals.
- **Site visits** to entities that are under review.
- **Document reviews**, including applicable laws and regulations, agency policies and procedures pertaining to study objectives, and published reports, audits or studies on relevant topics.
- **Data analysis**, which may include data collected by agencies and/or data compiled by JLARC staff. Data collection sometimes involves surveys or focus groups.
- **Consultation with experts** when warranted. JLARC staff consult with technical experts when necessary to plan our work, to obtain specialized analysis from experts in the field, and to verify results.

The methods used in this study were conducted in accordance with Generally Accepted Government Auditing Standards.

More details about specific methods related to individual study objectives are described in the body of the report under the report details tab or in technical appendices.

Appendix E: Audit authority

The Joint Legislative Audit and Review Committee (JLARC) works to make state government operations more efficient and effective. The Committee is comprised of an equal number of House members and Senators, Democrats and Republicans.

JLARC's nonpartisan staff auditors, under the direction of the Legislative Auditor, conduct performance audits, program evaluations, sunset reviews, and other analyses assigned by the Legislature and the Committee.

The statutory authority for JLARC, established in **Chapter 44.28 RCW**, requires the Legislative Auditor to ensure that JLARC studies are conducted in accordance with Generally Accepted Government Auditing Standards, as applicable to the scope of the audit. This study was conducted in accordance with those applicable standards. Those standards require auditors to plan and perform audits to obtain sufficient, appropriate evidence to provide a reasonable basis for findings and conclusions based on the audit objectives. The evidence obtained for this JLARC report provides a reasonable basis for the enclosed findings and conclusions, and any exceptions to the application of audit standards have been explicitly disclosed in the body of this report.

Appendix F: Study process

View guide to JLARC Tax Preference Reviews [here](#).

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