

Economic Report on Petroleum Storage Tanks in Washington

Prepared for the Washington State Pollution Liability Insurance Agency

By

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
STATE INVOLVEMENT IN PETROLEUM STORAGE TANK MANAGEMENT	4
AGING INFRASTRUCTURE PRESENTS INCREASING RISKS	4
ECONOMIC IMPACTS OF SITE CLEANUP ON COMMUNITIES	4
ECONOMIC IMPACTS OF GASOLINE STATION CLOSURES ON COMMUNITIES	5
A NEW PROGRAM TO ADDRESS GROWING NEEDS	5
ALTERNATIVES ANALYSIS	5
STAFFING MODEL	6
1. INTRODUCTION	7
ACKNOWLEDGEMENTS	8
2. BACKGROUND	9
3. PROBLEM STATEMENT	13
WASHINGTON’S FUEL DISTRIBUTION INFRASTRUCTURE	13
INCREASED DIFFICULTY OF OBTAINING ADEQUATE INSURANCE	15
INCREASED DIFFICULTY OF OBTAINING PETROLEUM UST INFRASTRUCTURE LOANS	16
SIZE OF THE PROBLEM	16
4. ENVIRONMENTAL AND ECONOMIC IMPACTS OF POLLUTION AND CLEANUP	17
ENVIRONMENTAL IMPACTS OF LEAKING PETROLEUM STORAGE TANKS	17
DRINKING WATER SOURCE CONTAMINATION	18
HUMAN HEALTH IMPACTS	20
ECONOMIC IMPACTS OF CLEANUP ACTIVITIES ON LOCAL COMMUNITIES	21
DRINKING WATER SOURCE PROTECTION	21
PROPERTY VALUE EFFECTS	23
CLEANUP COSTS	25
SUMMARY OF BENEFITS AND COSTS OF PETROLEUM TANK CLEANUP	26
IMPACTS OF INCREASED CLEANUP RATES	28
5. ECONOMIC IMPACTS OF GASOLINE STATION CLOSURE AND ABANDONMENT	29
THE MARKET STRUCTURE OF THE RETAIL GASOLINE STATION INDUSTRY	29
ECONOMIC IMPACT OF GASOLINE STATION CLOSURE	29
ECONOMIC IMPACT OF GASOLINE STATION ABANDONMENT	32
6. PROGRAM DESIGN ALTERNATIVES	34
ANALYSIS OF STATEWIDE NEED	34
CRITERIA FOR EVALUATION/COMPARISON OF ALTERNATIVES	36
PREFERRED ALTERNATIVE: REVOLVING LOAN PROGRAM	37

7. REVOLVING LOAN PROGRAM ANALYSIS.....	41
FUNDING SOURCE: PETROLEUM PRODUCTS TAX	41
THE DEMAND FOR LOANS	42
REVOLVING LOAN PROGRAM PARAMETERS	43
SELF-SUFFICIENCY OF A REVOLVING LOAN PROGRAM	43
EVALUATION OF THE POTENTIAL FOR SELF-SUFFICIENCY	44
CASH FLOW PROJECTIONS	45
8. STAFFING MODEL ANALYSIS.....	49
STAFFING REQUIREMENTS FOR NEW PROGRAM ACTIVITIES	49
NEW POSITION: HYDROGEOLOGIST	50
NEW POSITION: ENVIRONMENTAL PLANNER.....	50
NEW POSITION: FINANCIAL MANAGER.....	50
REFERENCES	52
APPENDICES	56
APPENDIX A: LEGAL OPINION OF REVOLVING LOAN PROGRAM	56
APPENDIX B: PROGRAM DESIGN AND PILOT PROJECTS.....	61
APPENDIX C: PLIA STAKEHOLDER ENGAGEMENT	71
APPENDIX D: ACRONYMS USED IN THE REPORT	72

Executive Summary

This report was commissioned by the Washington State Pollution Liability Agency (PLIA) to design a capital financial assistance program to provide underground storage tank owners and operators with financial resources to remove, replace or upgrade underground storage tank fuel systems, retrofit existing systems to disperse renewable or alternative fuels, and to clean up contamination caused by legacy petroleum releases. In the capital budget signed by Governor Inslee on July 30, 2015 (HB 1115), PLIA was directed to provide a final report of the program design, as well as any associated legislative and budget recommendations to the Governor and Legislature.

This report also includes research and analysis focusing on obtaining an understanding of the economic and environmental impacts of cleaning up contaminated underground storage tank sites in Washington to support the program design.

State involvement in petroleum storage tank management

Owners and operators of petroleum underground storage tanks (USTs) are required by federal and state laws to demonstrate financial responsibility. Of all UST owners/operators, 91 percent meet these requirements with liability insurance purchased in the private insurance market. PLIA supports the viability of the state's liability insurance industry by acting as a reinsurer to 71 percent of these UST owners/operators.

PLIA's reinsurance covers claims over \$75,000, up to \$1 million. This preserves important economic incentives for owners/operators of UST to reduce risks of releases from their tanks, and reduces average premiums to UST owners/operators.

Aging infrastructure presents increasing risks

Washington's UST infrastructure is aging, with over 45 percent of the tanks more than 25 years old. Insurance companies are increasingly hesitant to insure tanks of this age due to the risk of leaks.

If the private liability insurance market were to withdraw from Washington, the state would be more likely to need a state assurance fund to cover UST site contamination costs. Other states have found these costly to fund and they expose the state to additional risk.

In addition to the challenges of meeting financial responsibility requirements, many UST owners/operators are unable to obtain loans to clean up sites and replace aging infrastructure in order to maintain the viability of their businesses.

By providing financial assistance, the state would be able to increase rate of closure of contaminated sites by making resources available to tank owners to complete the closure process.

By assisting in the revitalization of Washington's UST infrastructure, the state would increase the likelihood that private insurers will continue to offer policies within Washington state.

Economic impacts of site cleanup on communities

Site cleanups remove or mitigate many risks associated with petroleum product contamination. Some of the most notable impacts can be found in the reduced risks to community water systems, which provide the domestic drinking water supply to 87 percent of Washington residents.

At the current rate of 70 completed site cleanups per year, the value of risk reduction to drinking water systems may approach \$3.4 million per year, a figure which does not account for the avoided damages from replacing or treating a drinking water supply to remove contaminants.

The value of properties near contaminated UST sites may also be affected, with a range of studies estimating a measurable effect of contamination in terms of reduced property values. At the current 70-site per year cleanup rate, property value benefits range from \$1.2 million to \$3.2 million per year.

The cost of current site cleanups in Washington state is estimated at \$37.8 million per year, based on a cost distribution obtained from recent nationwide EPA data. Cumulative benefits of cleanup from the two categories considered above range from \$31 to \$91 million over 20 years.

Assuming the above relationship between benefits and costs holds, additional cleanup activities may produce between \$460,000 and \$1.35 million in cumulative benefits per site, at an average cost of \$540,000 per cleanup.

Economic impacts of gasoline station closures on communities

Washington's retail gasoline sector is highly competitive with low profit margins. Most gasoline stations are not owned by large corporations, but should be considered small businesses. The growing trend of high-volume gasoline stations at hypermarkets puts added pricing pressure on the smaller stations.

The closure of unprofitable businesses, including gasoline stations, is a normal market phenomenon, but can leave local communities without their primary source of motor vehicle fuel. The abandonment of gasoline stations can increase the chance of site contamination, decrease neighboring property values, and hinder economic development.

Whether a gasoline station will have a large negative impact if closed or abandoned would need to be addressed on a case-by-case basis; this can also be addressed in the revolving loan program design, which would allow the unique site-specific impact of closure/abandonment on local communities to be considered.

A new program to address growing needs

A state financial assistance program would provide tank owners and operators with the means to:

- Clean up historical or ongoing contamination caused by leaking tanks.
- Replace or upgrade aging fuel systems to prevent leaks and to dispense the kinds of fuels demanded in the current market.
- Help stations adapt to changing market conditions by allowing loans to include the installation of electric vehicle (EV) charging stations.

UST owners will find it increasingly difficult to obtain insurance due to the anticipated increase in the number of older tanks in the years ahead.

Moreover, with the recommended program design, interest and principal payments will return to a revolving loan trust account, so the state will be able to operate the program on a sustainable basis.

Alternatives Analysis

Two classes of program alternatives were examined. First, existing programs were evaluated to determine whether they were applicable to the target population of gasoline station

owner/operators. It was determined that they do not apply. The next step involved a comparison between grant and loan options for cleanup financing, and concluded that a loan program had a number of attributes that were favorable compared to a grant program.

Two funding mechanisms were considered: the existing Petroleum Products Tax (PPT), which funds PLIA's current programs, and the issuing of capital bonds. It was determined that the PPT would be sufficient to cover the costs of a loan program, and given that it is already in place, would be the preferred method to fund the loan program described below.

Recommended Approach: Revolving Loan Program

A revolving loan program could be adequately funded with the PPT. A key consideration is the long-term sustainability or self-sufficiency of the program under two scenarios:

- **Fund-level self-sufficiency**, where the interest earnings from loans provides the capital for new loans, is relatively easy to achieve, so long as interest rates are sufficiently high, and grant, principal forgiveness, and default rates are sufficiently low.
- **Program-level self-sufficiency**, where the interest earnings cover the incremental operating costs of the loan program, including new personnel, is aided by lending more, allowing PLIA to have a larger loan portfolio.

The revolving loan is consistent with the agency's mission and supports the maintenance and continuation of a viable reinsurance marketplace, making it an appropriate application of PPT funds.

Staffing model

PLIA's workload has increased over the past 20 years, while staffing level has remained fixed.

- The proposed loan program has unique features that require specialized knowledge and expertise.
- An additional 3 FTE positions are proposed:
 - Hydrogeologist to assess sites and ensure cleanup activities are being performed according to best practices.
 - Financial Manager to review loans, provide ongoing support to capital budgeting and financial operations.
 - Environmental Planner to market the program, coordinate with property owners, communicate and engage surrounding community, collaborate with the implementing agency to assess loan applications, and provide additional guidance to cleanup project managers.
- An interagency agreement with the Department of Health would provide additional staff resource that could assist with administration of the lending portion of the program.

1. Introduction

This report was commissioned by the Washington State Pollution Liability Agency (PLIA) to design a capital financial assistance program to provide underground storage tank owners and operators with financial resources to remove, replace or upgrade underground storage tank fuel systems, retrofit existing systems to disperse renewable or alternative fuels, and to clean up contamination caused by legacy petroleum releases. In the capital budget signed by Governor Inslee on July 30, 2015 (HB 1115), PLIA was directed to provide a final report of the program design, as well as any associated legislative and budget recommendations to the Governor and Legislature.

This report also includes research and analysis focusing on obtaining an understanding of the economic and environmental impacts of cleaning up contaminated underground storage tank sites in Washington to support the program design.

The complete text of the capital budget proviso can be found below:

NEW SECTION. Sec. 3085. FOR THE POLLUTION LIABILITY INSURANCE AGENCY
Underground Storage Tank Capital Program Demonstration and Design (30000001)

The appropriation in this section is subject to the following conditions and limitations:

- (1) The appropriation in this section must be used for projects that provide a benefit to the public through removal, replacement or upgrade of underground storage tank fuel systems, retrofit existing systems to disperse renewable or alternative fuels, and cleanup of contamination caused by legacy petroleum releases. All projects must develop and acquire assets that have a useful life of at least thirteen years. These requirements must be specified in funding agreements issued by the agency.
- (2)(a) \$1,800,000 of the appropriation is provided solely to design a capital financial assistance program to provide underground storage tank owners and operators with financial resources to remove, replace or upgrade underground storage tank fuel systems, retrofit existing systems to disperse renewable or alternative fuels, and to clean up contamination caused by legacy petroleum releases.
 - (b) The design must:
 - (i) Assess options for program structure and administration, and develop a recommended program design, financial management plan and staffing model;
 - (ii) Include data and legal analysis of statewide need, availability of existing fund sources for grants and loans, assessment of owner and operator willingness to participate and potential environmental and economic impacts of the loan program.
 - (iii) As part of the program design, the agency must conduct a pilot demonstration of a capital grant program that includes three study sites with aging tanks, demonstrated impact to either soil or groundwater, or both, and serious financial hardship, as defined in chapter 374-60 WAC. Each study site may not cost more than \$600,000.
- (3) The agency shall conduct the study in consultation with the office of financial management, and internal and external agency stakeholders.
- (4) The agency must provide a final report of the program design, as well as any associated legislative and budget recommendations, to the governor and legislature by October 1, 2015.

PLIA engaged Integrative Economics, LLC and Sound Resource Economics, firms with regional experience in environmental economics, resource management, and public finance, to undertake the production of the report. This report includes the necessary research and analysis required to evaluate the program and provide legislative and budget recommendations to the Governor and Legislature.

Acknowledgements

The authors of this report wish to extend thanks to PLIA Director Russ Olsen and staff members, including Cassandra García, Cyndy Putscher, Xyzlinda Marshall, and Carrie Pederson for their invaluable help in providing the context and information needed to put together the report.

2. Background

Petroleum underground storage tank (UST) systems are regulated under Subtitle 1 of the Resource Conservation and Recovery Act (RCRA), which was passed by Congress in 1984 and amended in 1986. The 1986 amendments directed the U.S. Environmental Protection Agency (EPA) to establish regulations aimed at assuring UST owners or operators had adequate financial resources to cover the costs of cleaning up any releases from USTs and compensating third parties for damages. These financial responsibility regulations are codified in 40 CFR Part 280, Subpart H. Additional EPA and state regulations were published in 2015 dealing with operations and maintenance of tanks, but did not alter the financial responsibility requirements described below.

Owners or operators of USTs must demonstrate assurance of financial responsibility (FR). Only one person (the owner or operator) is required to demonstrate FR, but both are potentially liable in the event of noncompliance with FR regulations. Nonmarketers¹ with monthly throughput greater than 10,000 gallons, and all petroleum producers, refiners, and marketers must have per occurrence coverage of \$1.0 million, and aggregate coverage of \$1.0 million for 100 or fewer tanks, or \$2.0 million for more than 100 tanks. Nonmarketers with monthly throughput of 10,000 gallons or less must have the same aggregate coverage, but only \$500,000 per occurrence (40 CFR § 280.93). States may adopt their own FR requirements if they are at least as stringent as the federal requirements. Washington's FR rules are given in WAC 173-360-406 and match the federal FR regulations above.

Private (non-governmental) owners or operators of petroleum USTs can demonstrate financial responsibility in several ways:

- By having adequate financial resources to self-insure.
- With a guarantee, surety bond, or letter of credit, any of which may also require a standby trust fund.
- Through use of a state-required mechanism that is at least as stringent as the federal requirements.
- By obtaining liability insurance from a qualified insurer or risk retention group.
- Through a trust fund established by the owner or operator.
- Through the existence of, and participation in, a state fund or other state assurance.

A local government may also act as a guarantor, provided they pass a bond-rating test (40 CFR § 280.93).

Thirty-five states have state financial assurance funds that are designed to pay for new and past releases from UST systems. Another five states have assurance funds to cover past releases only. The remaining ten states, the District of Columbia and the five U.S. territories do not have state assurance funds. Washington falls in this latter group. As of 2015, an estimated 91 percent of UST owners or operators in Washington rely on liability insurance to meet the federal FR requirements (EPA 2015b).

With the new UST regulations came uncertainty as to the potential riskiness of insuring USTs. Many owners were unable to afford or acquire liability insurance due to high premiums and stringent underwriting requirements. To facilitate the formation of the private insurance market for petroleum

¹ Petroleum marketers include “all facilities at which petroleum is produced or refined and all facilities from which petroleum is sold or transferred to other petroleum marketers or the public.” Nonmarketers, then, would include UST owner/operators that do not sell product to the public or the trade, such as government vehicle fueling stations.

USTs, in 1989 the state of Washington passed RCW 70.148, which authorized a reinsurance program, to be managed by the newly authorized Pollution Liability Insurance Agency (PLIA).

PLIA’s mission statement reads:

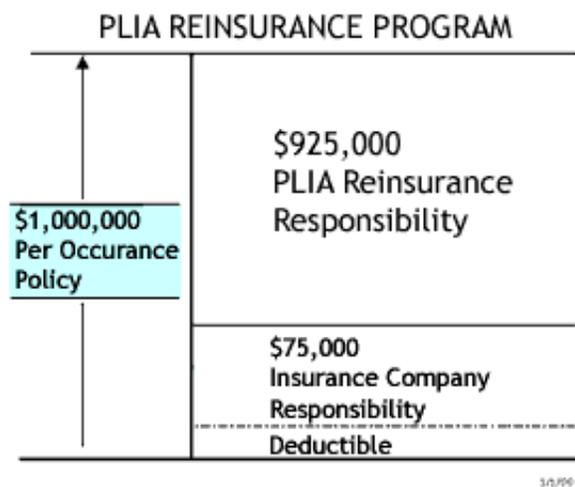
The Pollution Liability Insurance Agency (PLIA) works to provide an effective and efficient government funding model to support owners and operators in meeting financial responsibility and environmental cleanup requirements for underground storage tanks. (PLIA 2015)

The intent of legislators in enacting RCW 70.148 was to keep insurance affordable, while still providing an incentive for risk reduction:

[I]t is the intent of the legislature that the program follow generally accepted insurance underwriting and actuarial principles and to deviate from those principles only to the extent necessary and within the tax revenue limits provided, to make pollution liability insurance reasonably affordable and available to owners and operators who meet the requirements of this chapter, particularly to those owners and operators whose underground storage tanks meet a vital economic need within the affected community. (RCW 70.148.005)

Reinsurance works like insurance for the primary insurer. PLIA enters into treaties with private insurers, which cap the insurers’ liability at \$75,000 per occurrence. The treaties also stipulate a maximum deductible of \$60,000 for the policies issued. For example, if a UST owner has a liability insurance policy with a \$40,000 deductible and contamination is found at his UST site, then the owner would pay up to the \$40,000 amount of the deductible. The insurance company would pay for the next \$35,000, and the reinsurance program would cover any claims over \$75,000, up to \$1 million. See **Figure 2.1**.

Figure 2.1. Allocation of financial responsibilities under PLIA’s reinsurance program.



Source: PLIA.wa.gov

PLIA currently has treaties with three insurance companies: Colony Group, Crum & Forster Specialty Insurance Company, and Great American E&S Insurance Company. Policies reinsured by PLIA insure 2,026 sites and 5,729 tanks (PLIA, UST database, September 21, 2015), representing 71 percent of all petroleum UST sites in Washington (ASTSWMO 2015b).

Insurance premiums are based on numerous factors that affect the risk of a leak, the timeliness of leak detection, and the expected costs of cleanup should a leak occur. The age, design, and construction of the tank(s) on a site affect the likelihood of a leak. The distance to any surface water

and the distance to the groundwater table can affect the cost of a cleanup and third-party damages. The installation of secondary containment systems, and leak detection and monitoring devices can reduce insurance premiums. Policyholders may also have an option to purchase retroactive coverage that covers any leaks that occurred prior to the purchase of the insurance policy.

While insurance companies always had the option of purchasing reinsurance on the private market, such reinsurance added substantially to the premiums charged to policyholders. Washington's approach sets the cost of reinsurance at 1.0 percent of the premium, resulting in a lower premium for policyholders. This serves to reduce the average premium for liability insurance. Early critics of the reinsurance program asserted there was little reason to cut premiums since most claims were expected to fall under \$75,000. The historical evidence rebuts this assertion, as the Pollution Liability Insurance Trust Account paid over \$8.7 million in claims in the first ten years of the program.

Two key distinctions between Washington's reinsurance program and a state assurance fund are worth noting. First, with reinsurance, the premiums charged by the primary insurers vary based on risk, giving the owners or operators an incentive to reduce such risks, unlike a state assurance program where UST owners and operators pay a fixed fee. Second, the participating insurance companies in Washington are directly or indirectly responsible for rating, pricing, and issuing policies, risk management, and claims management.² While an alternative to a reinsurance program might directly offer liability insurance to UST owners or operators at a fixed rate, such an approach would invite adverse selection, in which the worst risks would sign up for such a state insurance program, while lower risks would use one of the other allowed FR mechanisms, including obtaining insurance through the private market.

The Commercial UST Reinsurance Program pays UST claims from the Pollution Liability Insurance Trust Account, which receives its primary funding from the Petroleum Products Tax (PPT). The Washington State Legislature authorized the PPT in 1989 in RCW 82.23A. The PPT is levied on petroleum products once, when they first enter the state. The tax rate was initially set at 0.005 (0.5 percent), and is now 0.003 (0.3 percent), effective as of July 1, 2013. The PPT is imposed if the Pollution Liability Insurance Trust Account's unrestricted balance falls below \$7.5 million and it is suspended when the unrestricted account balance exceeds \$15.0 million (RCW 82.23A.030). The PPT was imposed for the four-year period from Fiscal Year 1990 through Fiscal Year 1993, for one year in Fiscal Year 2004, and for the first three quarters of Fiscal Year 2010, all at the higher 0.005 percent tax rate. UST claims paid from the inception of the reinsurance program through Fiscal Year 2015 total \$37.9 million. Claims for Fiscal Year 2015 were \$3.2 million.

PLIA also administers the Heating Oil Pollution Liability Insurance Program, which offers \$60,000 of insurance coverage, at no cost to the owners, for the cleanup of contamination from residential heating oil tanks that are registered in the program. This program is funded from the Heating Oil Pollution Liability Trust Account through a 1.2 cents per gallon fee on heating oil distributors and supplemented by the Pollution Liability Insurance Trust Account.

PLIA, which serves all UST owners and operators in Washington State, is currently staffed by six full-time employees, with a biennial operating budget, excluding UST and heating oil tank claims payments, of approximately \$1.9 million. The agency's authorizing statute contains an expiration date, and must be reauthorized by the legislature in order to continue operating. Since the agency

² 70.148 RCW also states that it is not the intent of the state to "permit owners and operators of underground petroleum storage tanks to obtain pollution liability insurance without regard to the quality or condition of their storage tanks or without regard to the risk management practices..." (RCW 70.148.005).

was created, it has been reauthorized by the legislature four times. Currently the agency has a statutory expiration date of July 1, 2020.

KEY POINTS

- Owners and operators of petroleum underground storage tanks (USTs) are required by federal and state laws to demonstrate financial responsibility (FR).
- 91 percent of all UST owners/operators in Washington meet their FR requirements with liability insurance purchased in the private insurance market.
- PLIA supports a viable statewide liability insurance program for owners and operators of USTs by acting as a reinsurer to 71 percent of UST owners/operators.
 - Covers claims over \$75,000, up to \$1 million.
 - Provides incentive to reduce risk.
 - Avoids problem with adverse selection.
 - Reduces average premium to UST owners/operators.
- PLIA also administers a Heating Oil Insurance Program.
- PLIA's statutory authority expires on July 1, 2020.

3. Problem statement

The problems PLIA seeks to address with a financial assistance program are: 1) the inability of some UST owner/operators to obtain required insurance, and 2) their inability to obtain private-sector loans to rectify the problems preventing them from obtaining insurance coverage and maintaining compliance with FR requirements. This section discusses the factors driving this problem.

Washington’s fuel distribution infrastructure

The current petroleum UST system infrastructure in Washington is, as in other states, aging. **Table 3.1** gives the age distribution for privately owned commercial petroleum USTs that were listed as operational by the Department of Ecology, as of September 2015. These figures should be considered estimates, as the Department of Ecology database (Washington State Department of Ecology 2015b) used to construct Table 3.1 does not classify the sites by the type of use.

The distribution is given for all tanks, as well as for the oldest tank at each UST site. The latter distribution is most relevant for insurance purposes, as insurance is for the entire UST site, and loans would be for a site, not for individual tanks.

Table 3.1. Age distribution of commercial, non-government, petroleum USTs, as of September 2015.

Age range (years)	Distribution by tank age		Distribution by age of oldest tank at UST site	
	Number of tanks	Percent of total	Number of sites	Percent of total
0-5	240	3.1%	99	3.3%
5-10	316	4.0%	149	5.0%
10-15	427	5.4%	214	7.2%
15-20	1,336	17.0%	620	20.7%
20-25	1,967	25.0%	750	25.1%
25-30	1,797	22.9%	605	20.2%
30-35	895	11.4%	267	8.9%
35+	876	11.2%	287	9.6%
Total	7,854	100%	2,991	100%

There are several facts worth noting. First, of the 22.6 percent of tanks that are over 30 years old, more than half reached the critical 30-year age within the past five years. Second, the number of tanks surpassing the 30-year threshold will double over the next five years as the 25-30 age group transition to become the 30-35 year age group. Third, the number of tanks older than 30 years of age will more than triple within ten years, and nearly quadruple within 15 years. The distribution of the age of the oldest tank at each UST site tells a similar story.

Many of the younger tanks are those installed over the last 15 years at hypermarkets. As such, their owners have more financial resources, compared to the owners of the older tanks, which skew more toward the ‘mom and pop’ type operation.

From these age distributions, it is clear that the current indicators of increased premiums and cancelled policies is just the beginning of an aging infrastructure problem that is likely to grow for the next fifteen years, after which the growth rate of aging tanks should abate.

Another aspect of Washington's fuel distribution landscape is the changing nature of the fuel being used. One of the most noticeable changes nationally is an increase in the sale of fuels with increased ethanol content and the increased number of flex-fuel vehicles on the road. Flex-fuel vehicles can use fuel with up to 85 percent ethanol (E85) (U.S. Department of Energy 2015b). Fuels that exceed ten percent ethanol (E10) or 20 percent biodiesel (B20) are incompatible with many existing UST systems (Florida Department of Environmental Protection 2012). To be able to use a system to store these fuels, an owner or operator may need to upgrade system components or install an entire new UST system, including new tanks or tank linings and piping (40 CFR part 280). The cost of replacing an old tank varies from \$150,000 to over \$400,000, plus the lost profits during the construction period.

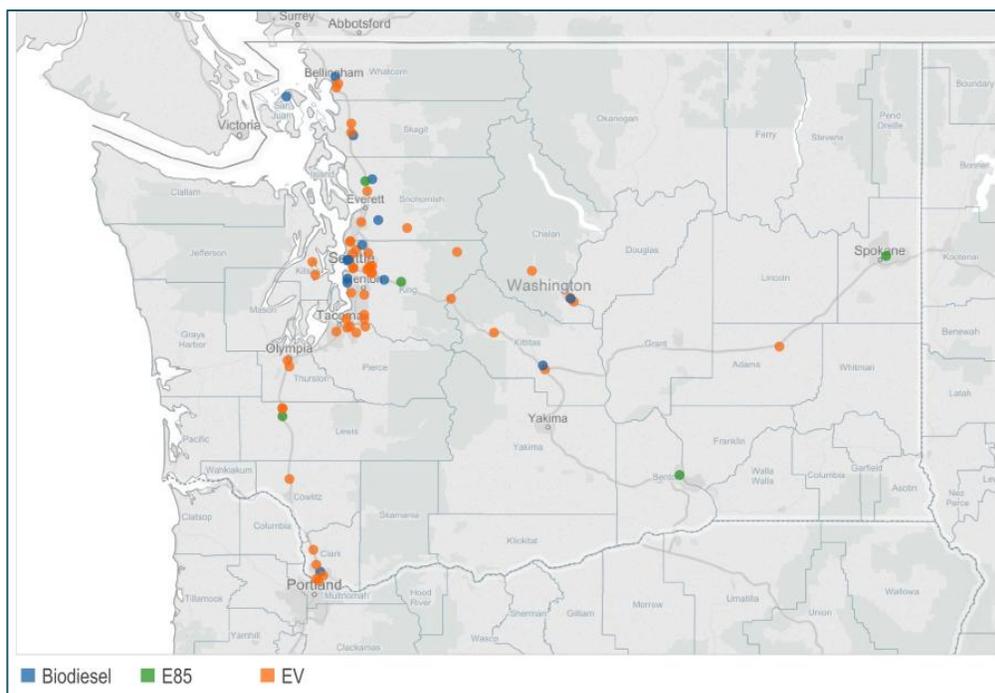
There is also a lack of electric vehicle (EV) charging stations in parts of Washington. With increased consumer willingness to purchase all-electric vehicles, an increase in manufacturers producing EVs, and falling costs of EV batteries, EVs are becoming more competitive with gas, diesel, and hybrid fuel vehicles. According to industry sources cited by the U.S. Department of Energy, approximately 9,000 EVs per month were sold in 2014, a 25 percent increase in sales compared with 2013.³

Figure 3.1 shows the location of gasoline stations selling E85 or biodiesel, and the location of EV DC fast charge charging stations.⁴ The latter are able to recharge an EV battery in 30 minutes or less.

³ <http://hybridcars.com/market-dashboard.html>

⁴ Figure 3.1 was compiled from data obtained from DriveBiodiesel.net (2015), E85Locator.net (2015), and U.S. Department of Energy (2015a).

Figure 3.1. Location of Biodiesel, E85, and EV fast charge stations in Washington, 2015.



Increased difficulty of obtaining adequate insurance

In 2014, 91 percent of Washington State UST owners or operators satisfied federal financial responsibility requirements through liability insurance. Another five percent self-insure and the remaining four percent use one of the other FR mechanisms (ASTSWMO 2015b).

The aging infrastructure poses two distinct problems related to obtaining liability insurance. First, USTs typically have manufacturer warranties of 20 to 30 years for the tanks and as little as one year for system components (California State Water Resources Control Board 2000). Insurance companies may be hesitant to insure tanks out of their warranty period. Second, insurance policies are written with retroactive dates specifying a cutoff date for the coverage of prior – yet undiscovered – spills. Older tanks are likely to have retroactive dates with gaps in coverage, leaving the owners or operators at greater financial risk.

While no data are available to support this hypothesis, it is reasonable to expect increases in insurance premiums due to higher risks from aging UST systems. This is not necessarily a problem. Indeed, Washington’s approach relies on the link between risk and insurance premiums to act as an economic incentive for owners and operators to meet technical requirements and reduce the risk of site contamination. If UST owners and operators are unable to act on those incentives to upgrade their facilities, then the higher premiums are not serving one of their intended purposes.

PLIA staff has received reports from insurance underwriters supporting the notion that increasing UST tank ages and poor UST site conditions have made it more difficult or impossible for some UST owners or operators to obtain liability insurance that would satisfy federal FR requirements. In a draft report, the Association of State and Territorial Solid Waste Management Officials does include comments from insurance industry representatives confirming the possibility of high-risk tanks facing the possibility of policy cancellation (ASTSWMO, forthcoming). More research on a

national level must be done to quantify these impacts, a fact mentioned in a 2011 EPA report that flagged this question for further research (EPA 2011d).

Increased difficulty of obtaining petroleum UST infrastructure loans

While the difficulty in obtaining adequate liability insurance to meet federal financial responsibility requirements is a problem, the real crux of the problem is the difficulty of obtaining financing to upgrade or replace petroleum UST infrastructure or to cleanup prior contamination.

There are four specific problems:

- Banks will not lend on properties with known contamination.
- Banks will not lend on properties where there are gaps in liability insurance coverage.
- A UST site owner may have no other securable asset to act as collateral on a bank loan.
- A UST operator who leases their site cannot use the site itself as collateral for a bank loan.

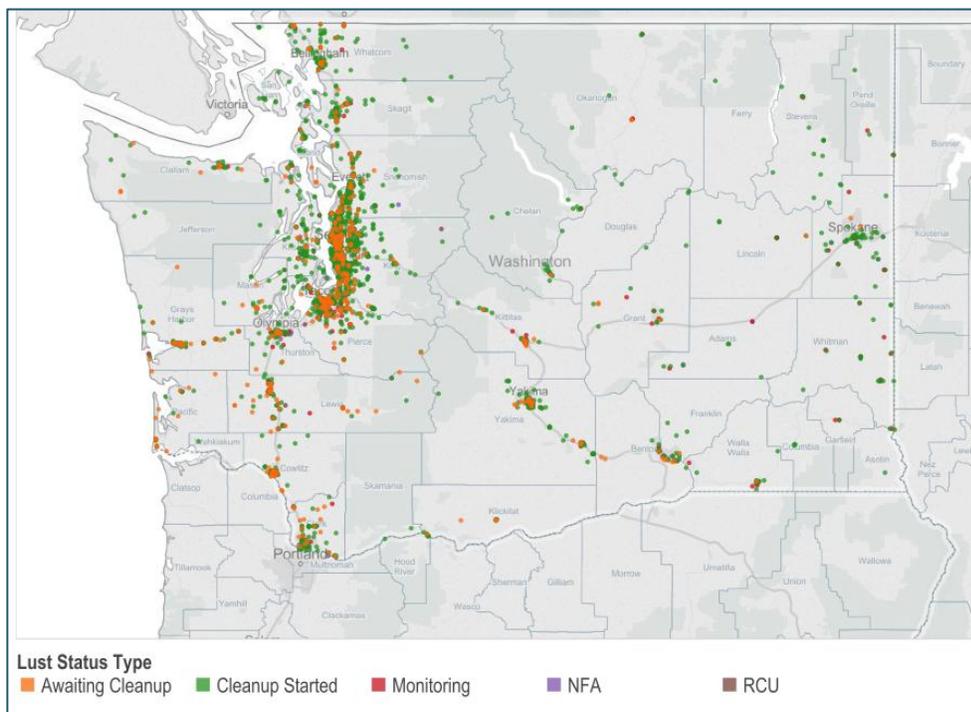
The nature of the problem is circular: owners and operators would like to make site improvements, but the capital needed to make such improvements is not available due to the site conditions. As with the evidence on lack of liability insurance coverage, there is no good data on the extent of these problems, but reported cases of loan denials are consistent with how one might expect banks to treat risky loan applications. While a gasoline station may carry the name of a national or international oil company as a branding tool, most at-risk gasoline stations are not owned or operated by the large oil companies. According to market research firm ACNielsen, only 471 of gasoline stations with convenience stores nationwide (0.4 percent) were owned by one of the five major oil companies as of June 2012.⁵

Size of the problem

Ultimately, the lack of liability insurance coverage and the inability to secure loans causes health risk to the public and impacts on neighboring properties in the form of leaking underground storage tanks (LUSTs). Department of Ecology data on LUST sites indicate that, as of September 2015, there were 501 sites awaiting cleanup and another 2,138 sites where cleanup had started but had not been completed (Washington State Department of Ecology 2015a). See **Figure 3.2**.

Figure 3.2. Location of Locations of Leaking Underground Storage Tank (LUST) sites in Washington, 2015.

⁵ http://www.nacsonline.com/YourBusiness/FuelsReports/GasPrices_2013/Pages/WhoSellsGas.aspx



Washington has made significant progress in LUST cleanups since the 1990s, having completed the cleanup of 4,768 of 6,805 confirmed releases by March 31, 2015 (U.S. EPA 2015a). If financial resources were available to modernize and replace USTs, the state would be able to increase the rate of closure.

KEY POINTS

- Washington’s UST infrastructure is aging, with over 45 percent of the tanks more than 25 years old.
- Replacing or upgrading older tanks will reduce the risk of future leaks and lower insurance premiums.
- Insurance companies are increasingly hesitant to insure tanks over 25 years old due to risk of leaks.
- If the private liability insurance market were to withdraw from Washington, the state would be more likely to need a state assurance fund to cover UST site contamination costs.
- Old tanks, risk of prior contamination, known prior contamination, and inadequate insurance coverage make banks unwilling to lend to UST owners/operators, particularly those that are small businesses.

4. Environmental and economic impacts of pollution and cleanup

Environmental impacts of leaking petroleum storage tanks

Leaking petroleum storage tanks can have far-reaching impacts on drinking water supplies, and adjacent land uses. This section characterizes some of the environmental risks posed by leaking tanks to drinking water systems and human health, and estimates some of the economic benefits received by households in Washington resulting from the current rate of cleaning up contaminated sites.

Drinking water source contamination

The potential for groundwater contamination to impair drinking water systems and private wells is an area of concern to regulators and communities alike. In addition to the health impacts of low-level, chronic exposure, contamination may render an entire system's water unusable.

In a 2009 report, the Washington State Department of Ecology (WA State Department of Ecology 2009) examined the risks posed by leaking underground storage tank sites near "high susceptibility" drinking water wells. Some of the key findings are reproduced here:

- Washington's 1,581 high susceptibility wells supply water for approximately 2.5 million people in the state. These are vulnerable due to a combination of shallow wells pumping water from unconfined aquifers with highly permeable subsurface conditions.
- Nearly 20 percent of the 1,915 LUST sites considered in the study are located within one mile of a high susceptibility well.
- Over half of LUST sites are located within one mile of *any* well. Even wells not considered highly susceptible face some risk of contamination via cracked or damaged well casings.
- 15 LUST sites with the gasoline oxygenate MTBE (a suspected carcinogen) are located within one mile of a high susceptibility well.
- Nearly 12 percent of LUST sites overlie Washington sole source aquifers (SSA).⁶
- 30 of 1,915 (1.5%) LUST sites are within 330 feet of a Puget Sound stormwater drain.

The effect of a tank release on drinking water systems is expected to vary with the severity of the leak and the characteristics of the water system. Smaller systems that rely solely on groundwater would be highly vulnerable to a disruption, while larger systems with multiple sources of supply spread out over a wide geographic area may more easily adapt to the loss of a single well.

The Ecology study highlighted ten water systems for their relatively high-risk profiles. Based on a review of system plans and DOH water system data, we calculate the percentage of each water system's supply that may be vulnerable to contamination from LUST sites. These are shown in **Table 4.1**, below.

⁶ An aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. See <http://water.epa.gov/infrastructure/drinkingwater/sourcewater/protection/solesourceaquifer.cfm> (Retrieved September 21, 2015)

Table 4.1. Water systems with groundwater wells at risk. (Source: WA State Department of Ecology 2009)

Water system	Population served	Estimated supply at risk
Tacoma	337,793	10%
Spokane	219,708	50%
Renton	54,649	80%
Auburn	45,120	65%
Richland	43,662	80%
Tumwater	31,500	30%
Centralia	14,000	40%
Battle Ground	12,958	20%
Omak	4,705	50%
Yakima	4,242	50%
Total	768,337	

While not valued here in dollar terms, commercial enterprises also use groundwater in their operations, such as the state’s sizeable food processing industry, which generates billions of dollars in annual revenues and provides thousands of jobs throughout the state.⁷

Costs of MTBE Contamination in Santa Monica, California

In 1996, the city of Santa Monica, California, with a population of approximately 90,000, was forced to shut down drinking water production at its public wells due to MTBE contamination from leaking underground storage tanks. This eliminated roughly 50 percent of the city’s supply within a year of the contamination being discovered.

The city was able to acquire water from neighboring districts, but this came at an additional expense of \$350,000 to \$400,000 per month.

While the cleanup and ongoing remediation was paid by two major oil companies as part of a settlement, it took 15 years of litigation, remediation, and the construction of a \$60 million treatment facility before the city could resume production from its wells.

Sources: City of Santa Monica (<http://www.smgov.net/santamonicawatertreatmentplant.aspx>), Heineman 2011.



⁷ <http://agr.wa.gov/aginwa/docs/127-ProcMap2015-Copier.pdf>

Human health impacts

Human health risks are a primary driver of the regulation of USTs under environmental law. The myriad combinations of volatile organic compounds (VOCs) in petroleum products have long been a topic of interest to health researchers, though the risks of many compounds in petroleum are still unclear. Here, we focus on chronic exposure to benzene ingested from drinking water and its relation to cancer risk to provide an approximation of the human health impacts of petroleum product contamination. While other gasoline constituents have been linked to adverse health effects (most notably MTBE in recent years), most studies for policymaking purposes limit the number of risks and exposure pathways addressed in the analysis to those that are best understood and documented in the literature (EPA 2000, EPA 2011a, 2011b, 2011c).

Based on a 2010 risk analysis supporting revisions to federal UST regulations, the expected number of cancer cases is reported on a per-release basis, based on a range of scenarios increasing in severity from a 10-gallon leak discovered one year after release to a 5,000-gallon leak discovered 100 years after release. With approximately 3,000 releases in Washington, the expected number of cancer cases *possibly* attributable to benzene exposure is shown in **Table 4.2**, below for this range of release severities.

Table 4.2. Estimated human health impacts of benzene contamination in Washington.

	1 year until discovery, 10 gals. released	1 year until discovery, 50 gals. released	5 years until discovery, 50 gals. released	100 year until discovery, 5,000 gals. released
Expected # cancer cases per UST release (1,2)	0.000000012	0.000000032	0.00000017	0.000019
Estimated # of releases	3,000	3,000	3,000	3,000
Cancer cases/100,000	3.6	9.6	51.0	5,700

(1) From benzene exposure via contaminated drinking water

(2) Source: RTI International, "Risk Analysis to Support Potential Revisions to Underground Storage Tank (UST) Regulations," December 22, 2010.

To put the above table into perspective, a 5,000-gallon leak does not necessarily represent an isolated occurrence. In a 2014 report, the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) related the details of 21 severe LUST releases nationwide since 2007. At least 13 of these events (62 percent) involved the release of more than 1,000 gallons of product; of these, four (19 percent) involved the release of more than 5,000 gallons (ASTSWMO 2014).

Economic impacts of cleanup activities on local communities

The benefits of a site cleanup/remediation can be expressed as an increase in the value of a desired outcome, such as recreational use or property value, or in terms of costs avoided by the cleanup. We discuss two categories of the economic benefits of site remediation:

- **Drinking water source protection** – based on the avoided loss of safe, reliable drinking water from community water systems and private wells
- **Effects on neighboring property values**, as well as avoided damages from underground contamination (e.g. vapor intrusion)

In addition to the above benefits, the direct costs of site cleanup/remediation, including planning and design, construction and cleanup, and ongoing will be estimated on a statewide, annual basis.

Table 4.3 shows the calculations necessary to estimate the benefits of the current level of cleanup activities on drinking water systems:

Table 4.3: Calculation of economic benefits of cleanups on drinking water systems

Step	Notes
1. Determine number of households at risk	Taken from Table 4.1, divided by average people per household statewide
2. Estimate household willingness to pay (WTP) for drinking water availability	Literature survey of household WTP (summarized in Table 4.4)
3. Estimate reduction of drinking water system risk due to cleanups (70 per year assumed)	EPA (shown in Table 4.5)
4. Multiply lines 1*2*3	= Annual value of avoided drinking water system impairment

Drinking water source protection

The economic value of drinking water is not necessarily equal to the price paid by the ratepayers of community water systems. These prices are typically based on the average costs of delivering the water to households, but do not reflect the full value to the people consuming it. The concept of willingness to pay (WTP) is used, rather than market price, to estimate this value. Put simply, WTP is the maximum amount an individual is willing to give up in order to obtain drinking water of a certain quality. In these terms, a deterioration of drinking water quality or a service interruption due to source water contamination would be considered an economic loss.

Household Willingness-to-Pay for drinking water availability

Numerous studies have estimated the household WTP for avoiding impairment of community water system supplies. The estimates reported here range from \$310 to \$1,049 annually. These figures, multiplied by the number of households and the proportion of system supply at risk, results in the system-wide WTP figures reported in **Table 4.4** for the ten water systems described earlier in this section.

Table 4.4. Estimated willingness to pay to avoid drinking water impairment, by water system.

Water system	WTP - Low	WTP - Med	WTP - High
Tacoma	\$4,237,999	\$9,440,319	\$14,347,786
Spokane	\$14,673,545	\$32,685,930	\$49,677,426
Renton	\$5,397,661	\$12,023,515	\$18,273,834
Auburn	\$3,495,556	\$7,786,496	\$11,834,238
Richland	\$4,329,729	\$9,644,652	\$14,658,340
Tumwater	\$1,290,070	\$2,873,683	\$4,367,543
Centralia	\$720,076	\$1,603,998	\$2,437,823
Battle Ground	\$260,750	\$580,832	\$882,772
Omak	\$306,309	\$682,316	\$1,037,012
Yakima	\$241,646	\$538,276	\$818,094
Total	34,953,341	77,860,017	118,334,867

Probability of Drinking Water System Impairment

The extent to which cleanups remove the potential for drinking water contamination represents the annual economic benefits as defined in this section. **Table 4.5** lays out the first set of calculations: the expected reduction in contamination risk to the ten vulnerable water systems listed in the 2009 Ecology report. **An estimate of the additional cleanup benefits made possible by the proposed revolving loan fund program follows this analysis.**

Table 4.5. Avoided contamination of drinking water systems at current cleanup rate

70	Cleanups per year (historical average in Washington, Dept of Ecology 2014)
41%	Percent of UST releases affecting groundwater (1)
0.1%	Assumed probability of UST release disrupting water supply
0.0287	Well contamination events avoided per year

(1) EPA 2011 UST Appendices, Page G4

While the probability of a contamination event (0.0287) in Table 4.5 may appear small, it is roughly equivalent to a major drinking water system contamination event occurring once every 35 years (the reciprocal of $0.0287 \approx 35$). Even at this seemingly low level of probability, the economic effects can be substantial, as shown in the calculations below.

Economic Benefits of Cleanups for Drinking Water Use

The WTP figures from Table 4.4 are multiplied by the reduced probability of a contamination event from Table 4.5 to calculate the annual economic benefits of site cleanups. These calculations are shown in **Table 4.6**, below.

Table 4.6. Avoided Annual Losses from water system impairment.

Avoided Costs of Water System Impairment	Low	Mid	High
Annual Household WTP for 10 water systems	\$34,953,341	\$77,860,017	\$118,334,867
Reduced probability of impairment	0.0287	0.0287	0.0287
Annual economic benefit	\$1,003,161	\$2,234,582	\$3,396,211

Property Value Effects

The impairment of land use has its own set of economic consequences. Polluted sites must be cleaned up, causing business interruptions that may reverberate throughout local communities. Vacant, contaminated sites may also depress nearby property values and prevent more valuable uses of adjacent properties.

Effects on gasoline station sites

Historical property sales data for gasoline station sites show no clear relationship between previous contamination and market value (Retail Petroleum Consultants 2015). This is due to a number of factors: if a gasoline station remains the highest and best use of the property, potential buyers will be willing to pay for the income-generating value of the site, which is not likely to be affected by past contamination once the site has been cleaned up. The effect of contamination on the value of a site awaiting cleanup is expected to be based on this income-generating potential, less a discount reflecting the costs and risks of remediation. This would require gasoline station property sales data and detailed information about site conditions that are not available at this time.

Based on these findings, we focus instead on the effects of site contamination on nearby properties, a topic that has been researched more frequently. This line of research spills into the broader topic of brownfield redevelopment, which is also discussed below. We focus specifically on the effects of a contaminated LUST site on the selling prices of commercial and residential properties in close proximity.

While it seems reasonable to assume that a contaminated property would have a negative impact on surrounding property values, the valuation literature remains ambiguous on this point. Studies on residential properties near contaminated sites have found negative effects in the range of 9 percent to 17 percent, but have also found cases where contamination was associated with an *increase* in nearby property values. The commercial property valuation literature shows a more consistent negative effect, with values ranging from a 29 percent to 42 percent reduction in property values near a contaminated site.

Property Value Estimates

While it would be ideal to have direct estimates of the economic effects of leaking petroleum storage tanks on property values, no empirical studies of this issue in Washington appeared in the literature review. A next-best approach is to survey the property valuation literature for studies conducted in other locations that are applicable to the UST situation in Washington.

Table 4.7 shows the calculations necessary to estimate the benefits of cleanup activities on property values.

Table 4.7: Estimated benefits of cleanup on property values.

Step	Notes
1. Determine value of properties that could be affected by LUST contamination	A. Identify parcels within 300 ft of UST B. Estimate property value from WA Department of Revenue
2. Estimate percentage of parcels actually affected by cleanup of a site	Assume 70 cleanups/year, divided by number of parcels from A, above
3. Calculate potential loss in property value due to contamination (%)	Range of values from literature review
4. Multiply lines 1*2*3	= Capitalized property value benefits

To estimate the impact of LUSTs on nearby properties, we begin with parcel data for 21 of the state's 39 counties for which data were available, selecting from these all parcels within 300 feet of an underground tank site. These counties⁸ represent over 78 percent of the state's population.

A literature review of property valuation studies across the country yielded a range of estimates for commercial and residential properties. These values ranged from a 5 percent to 17-percent reduction in value for residential properties to a 14-percent to 42-percent reduction in values for nearby commercial properties (Simons and Sementelli 1997; Simons, Bowen, and Sementelli 1997; Simons, Bowen, and Sementelli 1999; Gayer, Hamilton, and Viscusi 2000; Fischhoff 2001; Jackson 2001; Greenberg, Downton, and Mayer 2003; Davis 2004; Case, et al. 2006; Jenkins, Kopits, Simpson 2006; Messer, et al. 2006; Simons 2006; Zabel and Guignet 2012; Guignet 2013; Guignet 2014).

The GIS parcels were classified as commercial or residential based on data in the GIS files, and the impairment in residential/commercial property value was applied to the estimated total property value⁹, as illustrated in **Table 4.8**, below. The benefits of cleanup efforts were then estimated by multiplying these values by the percentage cleaned up per year (1.3 percent of residential parcels, and 2.1 percent of commercial parcels, were within 300 feet of a cleanup).

⁸ Only counties with parcel data available in GIS format were included.

⁹ Washington policy calls for assessed property values to be equal to market value.

Table 4.8. Estimated effect of 70 Leaking Underground Storage Tank (LUST) site cleanups/year on property values (millions of dollars)

Residential	Low	Mid	High
1. Value of parcels within 300 ft of LUST	\$3,445.0	\$3,445.0	\$3,445.0
2. Expected % of parcels within 300 ft of a LUST cleanup each year.	0.7%	0.7%	0.7%
3. Total property value impairment (%)	4.8%	9.5%	17%
Loss of residential property value (1 * 2 * 3)	\$1.2	\$2.3	\$4.1
Commercial	Low	Mid	High
1. Value of parcels within 300 ft of LUST	\$10,476.0	\$10,476.0	\$10,476.0
2. Expected % of parcels affected by a LUST	1.2%	1.2%	1.2%
3. Total property value impairment (%)	14%	28%	42%
Loss of commercial property value (1 * 2 * 3)	\$17.6	\$35.2	\$52.8

Sources: County GIS managers, Washington Department of Revenue, literature review. Figures in table are rounded

Cleanup Costs

Table 4.9 shows estimated annual costs for replacing and remediating underground storage tank sites, based on national data from EPA (EPA 2011c).¹⁰

Table 4.9. Estimated costs of tank replacement and remediation.

Costs of tank replacement/ remediation per site	Small extent, soil only	Large extent, soil only	Small extent, Groundwater Contamination	Large extent, Groundwater Contamination
Investigation, assessment, design, oversight	\$100,000	\$200,000	\$100,000	\$200,000
Tank replacement	<i>Estimated range between \$175,000 - \$400,000</i>			
Remediation activities*	\$26,800	\$120,700	\$117,000	\$453,200
Total costs per site	\$301,800	\$570,700	\$542,000	\$1,053,200
Frequency	51.9%	16.7%	6.2%	24.3%
Expected # cleanups by type	36	12	4	17
Expected annual costs by type	\$10,964,394	\$6,671,483	\$2,352,280	\$17,914,932

* Soil treatment, excavation, disposal, monitoring over relevant project lifetime

Grand Total cleanup costs: \$37.9 million/year

¹⁰ Costs for cleanup can come from a variety of sources including insurance claims, private funds, legal settlements, and in some cases grants from local, state or federal government grants.

Summary of Benefits and Costs of Petroleum Tank Cleanup

While the foregoing analysis is not a benefit-cost analysis in the exact sense of the word, it may be useful to compare the costs of petroleum tank cleanups with the benefits described above. There are several key points to report here:

There are many benefits associated with site cleanups, of which we have reported only two. If other benefits were to be included, such as avoided vapor intrusion issues and direct human health impacts (e.g., cancer cases), the benefits would be higher than the range reported here. Thus, the above analysis is conservative in its estimate of the benefits.

The analysis considers annual benefits, which accrue in perpetuity. On the other hand, cleanups can be thought of as a one-time cost (assuming they do not recur). This one-time cost needs to be compared against the stream of benefits (similar to an annuity) that occurs for decades into the future. For example, over 20 years, the net present value of a \$1 million/year annuity would be \$14.2 million at a 3.5% discount rate (the current rate on Washington State General Obligation bonds). The comparison of benefits and costs of cleanups are shown in **Table 4.10**, below:

Table 4.10: Comparison of benefits and costs of tank cleanups in Washington.

Annual Benefits of Cleanups (\$ millions)	Low	Mid	High
Drinking water systems	\$1.0	\$2.2	\$3.4
Property values (annualized)	<u>\$1.2</u>	<u>\$2.2</u>	<u>\$3.2</u>
Total annual benefits	\$2.2	\$4.4	\$6.6
Total benefits over 20 years (3.5% discount rate)	\$31.3	\$64.6	\$98.1
Annual cleanup costs (\$37.9 million avg, +/-10%)	<u>\$34.1</u>	<u>\$37.9</u>	<u>\$41.7</u>
Net benefits	-\$2.8	\$26.7	\$56.4

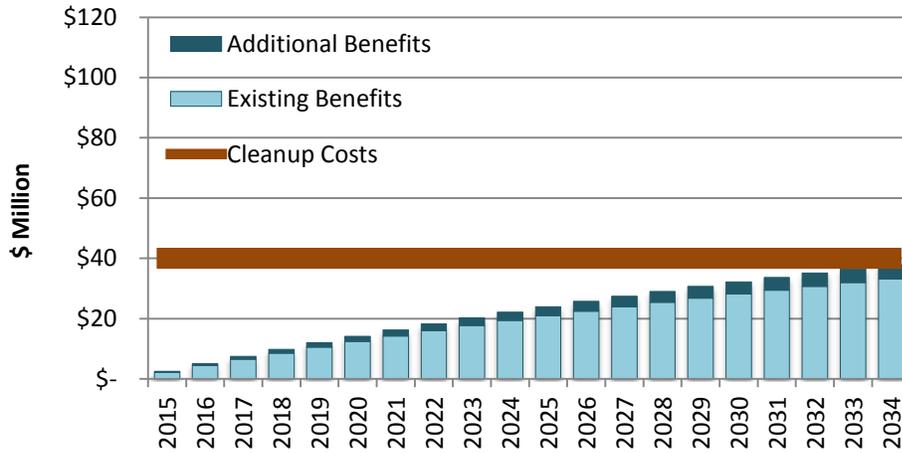
The broader conclusion is that the one-time costs of cleanup activities generally appear to be less than the lifetime benefits, in which case cleanup expenditures would be justified solely by their economic benefits (while still recognizing that cleanups must occur by law).

Payback Period of Investment in Cleanups

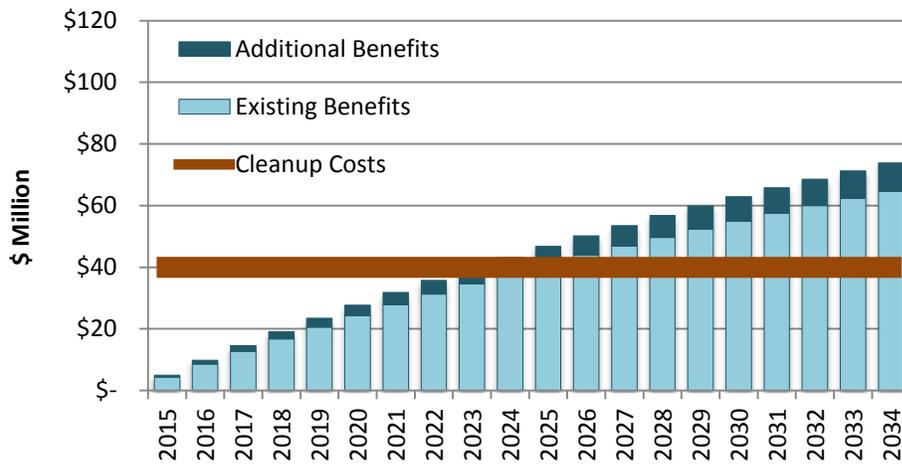
As the benefits of cleanup accrue over time, they can also be shown graphically, as in **Figure 4.1**, below, which compare the estimated benefits from Table 4.10 with cleanup costs. In the mid- and high-range benefit scenarios, it takes approximately ten years and five years, respectively, for benefits to outweigh the costs. In the low-benefit scenario, benefits do not exceed the costs in the timeframe analyzed, but considering that site cleanups are not optional, the benefits still offset most of the costs of cleanup.

Figure 4.1. Cumulative benefits of current (and accelerated) rate of cleanups, statewide.

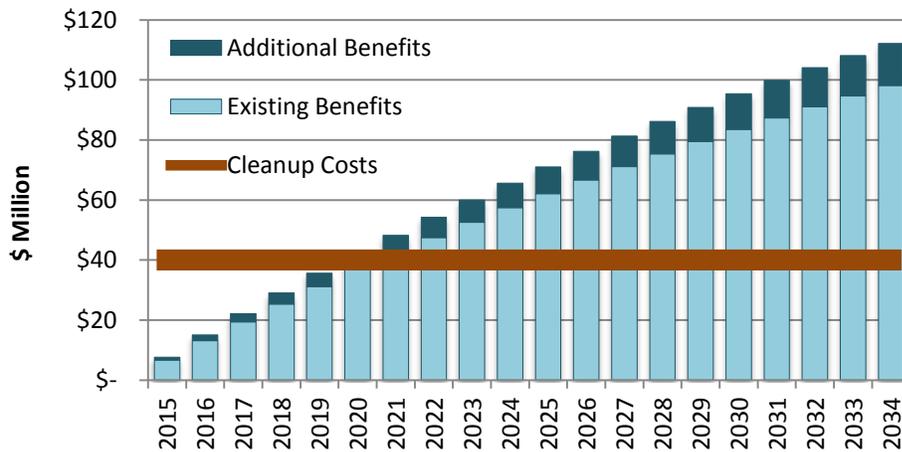
a. Low-benefit scenario



b. Mid-benefit scenario



c. High-benefit scenario



Impacts of Increased Cleanup Rates

The above benefits reflect the status quo, or no-action alternative. One of the expected impacts of the proposed revolving loan program described in this report is to increase the rate of site cleanups.

If \$10 million in financial assistance from revolving loans enabled an additional 10-15 cleanups per year, it would translate to an additional \$4.6 million to \$20.3 million in cumulative benefits and an additional \$4.9 million to \$8.1 million in costs, as shown in **Table 4.11**, below. Again, due to the nature of a revolving loan program, this \$10 million outlay may be recouped as loans are repaid.

Table 4.11. Benefits of increased cleanups.

Annual Benefits of Cleanups (\$ millions)	Low	Mid	High
10 additional cleanups	\$4.6	\$8.9	\$13.5
15 additional cleanups	\$6.9	\$13.4	20.3
Costs of cleanups			
10 additional cleanups	\$4.9	\$5.4	\$6.0
15 additional cleanups	\$7.4	\$8.1	\$8.9
Net benefits			
10 additional cleanups	-\$0.4	\$3.5	\$7.6
15 additional cleanups	-\$0.5	\$5.3	\$11.4

KEY POINTS

- Some of the most notable impacts from petroleum releases can be found in the reduced risks to community water systems, which provide the domestic drinking water supply to 87 percent of Washington residents.
- At the current rate of LUST cleanups, the value of risk reduction to drinking water systems is estimated to range between \$1.0 and \$3.4 million per year, a figure which does not account for the avoided damages from replacing or treating a drinking water supply to remove contaminants.
- The value of properties near contaminated USTs may increase following a cleanup, with a range of studies estimating a measurable effect of contamination in terms of property values. Based on a review of the valuation literature, we estimate statewide benefits of approximately \$1.2 million to \$3.2 million per year at the rate of 70 cleanups per year.
- Cumulative benefits of cleanup from the two categories considered above range from \$31 to \$91 million over 20 years.
- The cost of site cleanups is estimated at \$37.9 million per year, based on a cost distribution obtained from recent nationwide EPA data.
- Assuming the above relationship between benefits and costs holds, additional cleanup activities may produce between \$460,000 and \$1.35 million in cumulative benefits per site, at an average cost of \$540,000 per cleanup.
- Moreover, if interest and principal payments are returned to the state, the state will be able to maintain the program at a lower cost than the benefits realized.

5. Economic impacts of gasoline station closure and abandonment

This section addresses the economic impacts associated with the closure and abandonment of retail gasoline stations. ‘Economic impacts’ is a term that for clarity should be defined. Economic activities, by their nature, have economic impacts. The real question is whether those impacts are good or bad in some subjective manner. Economists tend to deal with this issue by examining economic efficiency. For purposes of this report, economic efficiency is assessed by looking at the impact on producer profits and on either consumer costs or consumer value.

The market structure of the retail gasoline station industry

Washington State had approximately 2,000 retail gasoline stations in 2012, with average sales of \$4.1 million per station. Employment averages 6.7 employees per station (United States Census Bureau 2015). Gasoline stations with convenience stores – a narrower definition – numbered approximately 1,700 in 2012, with average sales of \$3.8 million.

Gasoline station employment in Washington fell by 12.0% from 1997 to 2012, during a period when Washington’s population increased 6.7%. This decline is partially due to fewer stations, with the closure of approximately 100 stations since the start of the Great Recession in late 2007 and fewer employees per station (U.S. Census Bureau 2015a and 2015b).

The trend in gasoline stations is for an increasing number of high volume gasoline stations at large retailers, such as Costco. These ‘hypermarkets’ accounted for just 5.9% of all retail gasoline sales in 2002 (Depro, Wood, Jones, & Patil 2007), indicating they were a smaller percentage of the number of stations, given their higher average volume. This percentage was expected to have more than doubled by 2007 (Depro, et al. 2007).

The retail gasoline market is highly competitive, and is a good approximation of perfect competition, albeit with a spatial competition aspect added.¹¹ The analysis of the closure of a single firm in a perfectly competitive industry is fairly straightforward. Firms in perfect competition earn no long-run economic profits. While there are distributional impacts from the closing of a gasoline station – employees are laid off and suppliers are impacted – consumers are typically no worse off, at least when other gasoline stations are nearby and congestion at or getting to those stations is not an issue. Remote and rural gasoline stations do not fit this model well and this subject is revisited below.

One pertinent aspect of the retail gasoline station industry is the capital required to open a new station and to upgrade existing stations. A new station with a convenience store can cost between \$1 million and \$1.5 million. Adding a high-capacity gasoline station to an existing hypermarket can be as low as \$500,000 (EPA 2007).

The increasingly competitive nature of the retail gasoline market, particularly the high-volume stations that can benefit from economies of scale, makes it difficult for small-volume gasoline stations to cover their costs of UST upgrading. Facilitating financial assistance could help the stations survive, but an eye must be kept on whether the stations are viable in the longer term, given their local competition.

Economic impact of gasoline station closure

The reduction in the number of gasoline stations from prior to the Great Recession is consistent with how a perfectly competitive market would be expected to respond. As demand fell, some

¹¹ For empirical support, see Lee (2007) for a discussion and analysis of spatial competition in the San Diego, CA retail gasoline market.

gasoline stations were unable to avoid negative economic profits and shut down. That, in itself, is not problematic, assuming that other nearby stations remain open or new stations open to serve that population, and the increased business or change in traffic patterns will not increase congestion significantly.

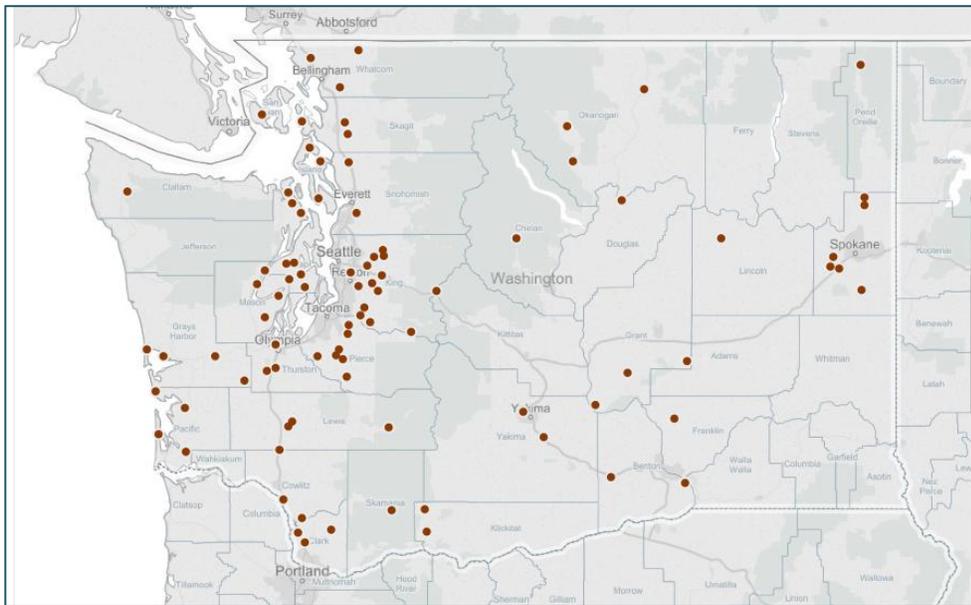
The closure of a gasoline station in a rural area, with no other stations nearby, is a different matter. To assess this situation, the Department of Ecology database on active UST facilities was used to obtain information on the location of the state’s retail gasoline stations. From that location information, the distance to the nearest two gasoline stations, and the number of gasoline stations within 1, 2, 5, 10, and 20 miles were calculated. The age of the oldest operational tank at each site was also calculated from the Ecology data. The result was a list of 2,046 gasoline stations, with information on the stations’ nearest competition (or substitutes, when viewed from the consumer’s perspective). The resulting distribution is shown in **Table 5.1**.

The group of greatest relevance for this study are those stations over 25 years old and more than two miles from the nearest neighboring gasoline station. This accounts for 90, or 4.4 percent, of the 2046 gasoline stations. See **Figure 5.1**. If the relevant population is expanded to include those that are more than one mile from another station, the relevant population increases to 210, or 10.3% of the total.

Table 5.1. Age and distance to nearest neighboring gasoline station, WA, September 2015.

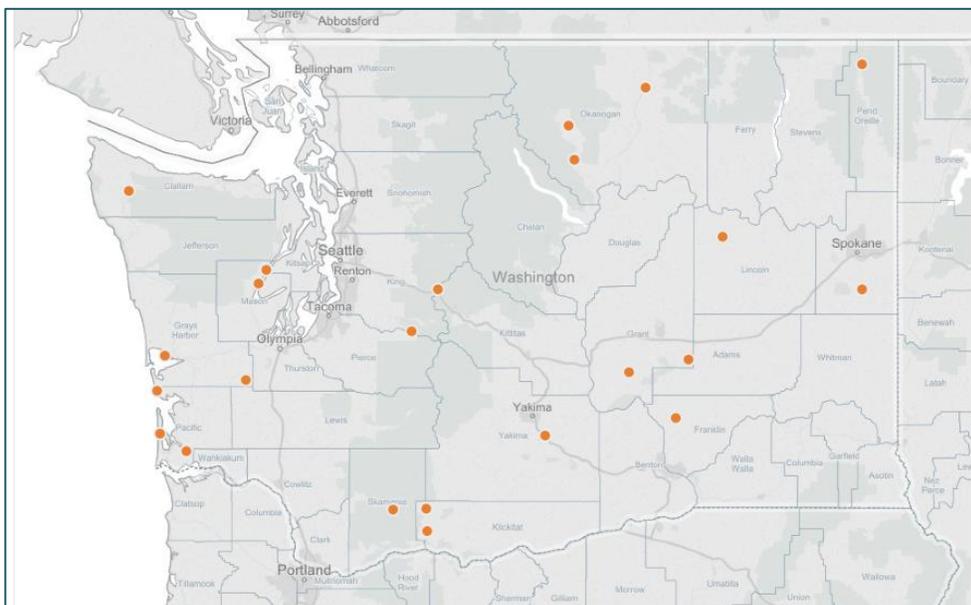
Age range (years)	Distance to nearest neighboring gasoline stations (miles)						Total
	<0.5	0.5-1	1-2	2-5	5-10	>10	
<20	420	170	85	70	17	762	1,524
20-25	245	84	39	41	20	21	450
25-30	270	71	32	31	9	4	417
30-35	103	49	24	18	5	3	202
35-40	39	15	13	9	1	2	79
40-50	49	24	12	4	2	1	92
>50	19	8	3	0	0	1	31
Total	1,145	421	208	173	54	45	2,046

Figure 5.1. Washington State retail gasoline stations with USTs more than 25 years-old and more than two miles from nearest neighboring gasoline station, 2015.



Another way to identify the stations with the potentially greatest impact from closure was to look at those over 25 years old and with no other stations within five miles. This produced a relatively small list of 23 stations. See **Figure 5.2**. Most of these were in relatively rural counties, including Grays Harbor and Okanogan, with three stations each, and Grant, Klickitat, Mason, and Pacific counties, each with two stations meeting these criteria.

Figure 5.2. Washington State retail gasoline stations with USTs more than 25 years old with no other gasoline stations within five miles.



It is difficult to make general statements about the customers served by rural gasoline stations and whether they are impacted by the closure of a gasoline station. A station located on a rural stretch of

highway may be primarily serving travelers, who have the option of stopping earlier or later to refuel. Loss of a gasoline station may pose an inconvenience, but substitutes are available with little increase in time or other expenditures. These customers are not as impacted as the local residents, who must drive further to refuel, leading to time costs and vehicle operating costs. The closure of a gasoline station may also lead to slight increases in gasoline prices at nearby stations. For example, a town with two stations benefits somewhat from price competition between the two stations. The loss of one of the two stations would be expected to increase prices at the remaining station.

Gasoline stations off of highways may serve to pull travelers into a town, benefitting other businesses. The economic activity is likely to shift to a different location, but does represent a distributional impact that may be important to these communities.

Given the sensitivity of any economic impact analysis to the location of a gasoline station, their customer base, the local population, and whether local government workers or emergency responders rely on the station for fuel, analyses should be on a case-by-case basis.

Economic impact of gasoline station abandonment

The economic impact arising from the abandonment of a gasoline station or other petroleum UST site is more complicated than the closure of a station. In addition to the impacts – or lack of impacts – discussed above, abandonment creates issues related to any needed site cleanup and closure. Many of the impacts have both economic efficiency and distributional components. Who pays for the cleanup and the impact on the economic value of surrounding property are two key issues.

The courts determine the final responsibility of who pays for site remediation of an abandoned gasoline stations. Both the owner and site operator are potentially liable, but the burden of the cleanup could fall to state taxpayers if the responsible parties are insolvent.

While any burden pushed onto state taxpayers is diffusely spread, the impact on neighboring property owners and the broader community is more concentrated. While there have been several studies¹² of the impact of LUSTs on surrounding property values, these studies do not address the abandonment of a LUST site. Indeed, the results can be difficult to interpret without taking the expectations of property owners, once contamination is found, into account. Guignet (2013) found that the discovery of a leak could actually increase surrounding property values. This is difficult to interpret and may indicate buyer expectations that the site will either be cleaned up promptly – implying that property values were depressed due to the uncertainty of contamination – or that the site will be converted to another, more desirable use. Guignet (2013) also finds that a negative market impact from LUSTs is most clearly seen with properties with drinking water wells, particularly if those wells have been tested for contamination.

With abandonment, the impact on neighboring properties will depend on how the local and state governments respond. If the site can be cleaned up quickly and either returned to use as a gasoline station, or converted to another use, property values can be expected to increase. Lack of action, uncertainty about cleanups, or lingering contamination, however, can stall such gains, leaving nearby property owners and the local community worse off.

The loss of a gasoline stations, whether it is due to closure or abandonment, can have quite different impacts from one community to the next. The loss of a station in an urban setting where there is no

¹² See Guignet (2013), Guignet (2014), and Zabel and Guignet (2012) for three of the most recent analyses of property value impacts.

site contamination and where the station's site is used for a more highly valued use can actually increase the well-being of the neighboring property owners and the general community. But the loss of a station in a rural community, with only one station, could have significant negative consequences. Because of these widely varying impacts, from the positive to the negative, each case of potential closure or abandonment should be evaluated on its own merits. Any policy or program that is better able to distinguish between these types of cases is likely to be more cost-effective at reaching Washington State's goals of protecting the health of its population and supporting local communities.

KEY POINTS

- Washington's retail gasoline sector is highly competitive with low profit margins.
- Most gasoline stations are not owned by large corporations, but should be considered small businesses.
- An increase in high-volume gasoline stations at hypermarkets puts added pricing pressure on the smaller stations.
- The closure of unprofitable businesses, including gasoline stations, is a normal market phenomena, but can leave local communities without their primary source for motor vehicle fuel and at an economic disadvantage.
- The abandonment of gasoline stations can increase the chance of site contamination, decrease neighboring property values, and hinder economic development.

6. Program design alternatives

Analysis of statewide need

As the findings in the previous sections of this report have demonstrated, there is clear evidence that contamination from leaking petroleum storage tanks poses growing risks to drinking water, human health, and economic activity in the state. In addition to these concerns, UST owners will find it increasingly difficult to obtain insurance due to the anticipated increase in the number of older tanks in the years ahead. For many tank owners and operators, there are no feasible options to pay for cleaning up contamination at their sites without effective insurance coverage or access to private sector loans.

While some programs have been devised at the federal and state levels to address environmental cleanup priorities in other media, to date, none of these programs apply to the needs faced by underground storage tank owners/operators.

In a 2014 report on the national LUST cleanup backlog, EPA examined the situation in Washington, such as sites undergoing repeated rounds of site assessment and remediation, concluding that, “in the long run, this approach might be both longer and more costly,” and recommended ways to accelerate the closing process for releases, such as allocating sufficient resources to characterize and remediate sites quickly and decisively (EPA 2014).

In response to the state’s leaking petroleum tank problems, a group of stakeholders¹³ has indicated support for addressing the market failure in which private insurers are unable to assume the heightened risks posed by aging tanks, and lenders are unwilling to extend financing to owners of impaired assets.

Following extensive conversations with participants in the petroleum tank cleanup, public health, and community economic development communities, PLIA is now evaluating options to provide the state’s tank owners and operators with the resources to:

- Clean up historical or ongoing contamination caused by leaking tanks.
- Replace or upgrade aging fuel systems to prevent leaks and to dispense the kinds of fuels demanded in the current market.
- Help stations adapt to changing market conditions by allowing loans to include the installation of electric vehicle (EV) charging stations.

Program alternatives

Two classes of program alternatives were examined. First, existing programs were evaluated to determine whether they were applicable to the target population of gasoline station owner/operators. These are illustrated in **Table 6.1** below. As can be seen, neither of the existing programs addresses the needs of the target population of private gasoline stations.

¹³ See Appendix D for list

Table 6.1. Existing cleanup financing programs.

Alternative	Features/examples	Applies to target population	Comments
Remedial action grants from Ecology	Funding to local governments that have completed independent remedial actions at a site	No	Privately-owned sites not eligible for program
Existing Drinking Water State Revolving Fund (DWSRF)	Can provide funds for source water protection, though this is often framed as a way to buy out contaminated sites	No	Funds are for community water systems, whose priorities may not include private tank cleanups.

The next class of alternatives includes three potential financing options to meet the needs of the state’s gasoline station owners and operators: grants, loans, and loan guarantees. These are summarized in **Table 6.2**, below.

Table 6.2. Potential financing program alternatives.

Alternative	Features/examples	Pros	Cons
Grants	Direct payment for cost of cleanups, upgrades, and replacement upgrades. Can fund entire cleanup or require matching funds.	A large pool of applicants could allow for the selection of high-value projects	Once initial funds are depleted, new appropriations are needed. Distorts market signals to grantees, leading to possible inefficiencies. Perception that government is “picking winners and losers.”
Revolving loan program	State-administered loan program for cost of cleanups, upgrades, and replacement. Debt service is returned to account, allowing for additional lending	Preserves economic incentives for owners and operators to reduce risks of future leaks. Loaned funds generate interest earnings	Requirements for financial management require additional expertise.
Loan guarantees	Private sector loans for cost of cleanups, upgrades, and replacement upgrades, backed by government guarantee in case of default.	Preserves economic incentives. Relatively simple statutory change	Requires buy-in from private sector lenders. Funds required to maintain guarantees must be held in reserve.

Two funding mechanisms were considered: the existing Petroleum Products Tax (PPT), which funds PLIA's current programs, and the issuing of the State general obligation (G.O.) bonds. It was determined that the PPT would be sufficient to cover the costs of a loan program, and given that it is already in place, would be the preferred method to fund the loan program described below.

No-action alternative

A no-action alternative would keep in place PLIA's reinsurance and heating oil tank funding activities until at least 2020, PLIA's statutory expiration date. While this is expected to support some portion of the annual site cleanup activities in the state, several factors have changed since the advent of the reinsurance model. The preceding sections of this report have described many of these factors, including the following:

- Insurance policies could be cancelled at an increasing rate each year due to the annual growth in the numbers of older tanks, leaving owner/operators in a position where they cannot operate their businesses.
- Forced site closures may have a disproportionate effect in remote areas served by few-and-far-between locations.
- Policy cancellation will slow the pace of cleanups, with negative environmental, economic, and fiscal impacts.
- Adoption rates of EV and alternative fuel technologies could be delayed, with associated environmental impacts, such as greenhouse gas emissions in excess of statewide targets.
- Community water systems providing drinking water to hundreds of thousands of households will remain at risk of shutdown or interruption due to contamination from leaking tanks.
- PLIA will face difficulties in fulfilling its reinsurance mission if insurers refuse to renew policies.

Criteria for evaluation/comparison of alternatives

The alternatives described above were evaluated along the following criteria:

- How well does the alternative cover the targeted population of tank owners?
- Can the program remain fiscally sustainable?
- Is the alternative based on a tested, successful model?
- How easily administered is the program?
- Does it have the support of multiple stakeholders?

A revolving loan program of the kind described in this report appears to have more of the above features than any of the alternatives. Such a loan program could operate indefinitely, in theory, as long as revenues from repayments are greater than the costs of running the program. The model has been used on a nationwide scale in the Clean Water- and Drinking Water State Revolving Fund programs, and lessons learned from those programs can inform a PLIA-managed program, both in terms of program design and administration (GAO 2015). By partnering with DOH, PLIA can leverage local experience in managing a revolving fund program. While stakeholder support is likely to depend on the program design and long-term financial outlook, there is great interest in addressing the aging tank problem in Washington. Finally, the proposal has obtained the support of EPA officials (Communication from EPA Office of Compliance and Enforcement to PLIA, October 7, 2014. See Appendix).

Revolving loan programs have other desirable features compared to grants. With a loan, owners or operators remain financially responsible for their activities, must meet underwriting requirements, and face the same set of tradeoffs and risks as other gasoline station operators who may be funding their cleanup projects from different mechanisms.

Preferred Alternative: Revolving Loan Program

PLIA proposes to use funds raised by the PPT in a revolving loan program, in which the interest and principal repaid by borrowers returns to the program, allowing for further lending activities. The program's financial model is described in more detail in Section 7.

Legal Analysis of Preferred Alternative

The state Attorney General's Office has issued an opinion affirming the validity of the proposed loan program. This is included in **Appendix A**. As the other alternatives were eliminated due to other criteria, they were not included here.

Proposed loan qualification criteria

Loan qualification criteria will be identified and finalized through the public engagement process based around rule development. Some considerations that have already been identified include the following:

- **Extent of historical contamination.** Immediate free product removal required, and impacted groundwater present.
- **Age of tank(s).** Older tanks are more likely to fail/have failed.
- **Site Hazard Assessment.** Level of environmental/ecological impact of historical contamination.
- **Financial need.** Owner can provide documentation of financing denial.
- **Impact to property value.**
- **Community need.** Isolated communities depend on the station as their source of motor vehicle fuel for essential emergency, medical, fire and police services.
- **EV charging station installation.** Incentivize the installation of EV charging stations.
- **Proximity to surface water and potable water.** Contamination that has potential to impact water resources.
- **Insurance need.** The inability to obtain insurance through a PLIA-reinsured provider.
- **Current policy exceeded.** Owner/operator exceeded their current policy limit for cleanup before completing cleanup.

Interest Rates for Loans

The mechanism for determining interest rates for loans in the proposed program will be determined during the rulemaking process, and will be based on criteria such as affordability to borrowers and financial sustainability of the revolving loan program.

Grants / principal forgiveness

Incentives may be offered to encourage participation in the loan program. These could take the form of reduced interest rates or in the forgiveness of a portion of the principal amount borrowed.¹⁴ These incentives may be extended to projects that include:

- Installing electric vehicle (EV) charging stations or alternative fuel dispensers.
- Sites located in remote areas or specially-designated zones, such as wellhead protection areas.
- Cleanup activities that score exceptionally high in the qualifying criteria.

As will be shown in Section 7, reduced interest rates and principal forgiveness will reduce the program's account balance and could limit the long-term self-sufficiency of the revolving loan program, so care must be taken when determining the scale of additional incentives. The costs of providing these incentives may be offset by leveraging funding from other sources. For example, projects qualifying for direct incentives could receive those benefits in lieu of principal forgiveness.

Potential environmental and economic impacts of the loan program

A revolving loan program funded by the PPT would allow existing resources (the Pollution Liability Insurance Program Trust Account) to be put to use toward a broader range of cleanup, drinking water source protection, and economic development activities. To the extent that cleanups funded by the revolving loan program are conducted in a shorter time frame or result in more case closures per year, the environmental and economic benefits of cleanup may occur at an accelerated rate.

One of the expected impacts of the proposed revolving loan program described in this report is to increase the rate of site cleanups. An additional 10-15 cleanups per year resulting from site owners/operators availing themselves of this loan program would translate to an additional \$4.6 million to \$20.3 million in cumulative benefits and an additional \$4.9 million to \$8.1 million in costs.

Assessment of owner / operator willingness to participate

PLIA's experience with its recent pilot grant offering provides evidence of strong demand for cleanup funding. With only a minimal amount of outreach, PLIA received 21 applications within 30 days for the three awards authorized in July 2015. While grants are expected to receive greater interest than loans, it is reasonable to infer that sufficient interest in a revolving loan program will be driven by the previously documented factors of aging infrastructure, insurability issues, and lack of sufficient private sector financing for cleanups, upgrades, and replacement.

Administrative costs

The costs of administering the revolving loan program are anticipated to be in line with the costs of the Clean Water and Drinking Water State Revolving Funds, which are administered by the state Department of Ecology (Ecology) and Department of Health (DOH), respectively. In some respects, individual tank cleanups may be less complex and easier to manage than these larger, system-wide loan programs.¹⁵ A funding level of \$10 million per year would provide at least 4 loans

¹⁴ These are often structured as performance-based incentives, in which the principal forgiveness occurs after specified criteria are met.

¹⁵ The average size of loans under the CWSRF and DWSRF are \$2.5 million and \$1.5 million, respectively. These loans are to systems with complex treatment, storage, and conveyance facilities, and stringent environmental and public health requirements, all of which strongly suggests that a loan to a single UST operator would be significantly less complicated.

per year. To ensure the availability of funds to all eligible operations, a cap on the amount of any single loan may also be warranted.

Nexus between who pays and who benefits

The site owners who take out loans from the revolving loan program would be paying back the loans with interest. As mentioned previously, this would maintain incentives for tank owners to make economically efficient investment decisions (i.e., borrowers would choose the level of replacement infrastructure appropriate to their operation – they would not over-invest in equipment). The allowances for principal forgiveness and preferential interest rates would be used to provide incentives for meeting certain policy objectives, and would do so possibly at a lower cost to the fund than a program that only awarded grants.

Estimated impact of loans on closure

As mentioned in the discussion of the EPA’s backlog study (EPA 2014), many factors influence the rate of case closures. The area most impacted by the availability of loans would be in the speedy infusion of capital to pay for site investigation and remedial actions that efficiently and effectively take care of the contamination, and avoids a drawn-out closure process.

It also stands to reason that insurance premiums would be lower after a successful cleanup, offsetting some of the costs of taking out the loan in the first place.

Other Considerations

Many details of the revolving loan program will need to be determined in the rule making process, based on collaboration between PLIA, the Washington State Department of Health, and other stakeholders at the state and local levels. The optimal financial parameters will be discussed in Section 7; other considerations include:

- Best practices to minimize default rates.
- Details of the loan process.
 - E.g., on a rolling basis, or on a specific schedule.
 - Applications review process.
- Key performance indicators.
- Developing synergies with other agencies/programs (e.g., volume-based discounts for electric vehicle charging equipment, leveraging local community development funds).
- Financial management plan – to be developed with implementing agency.

KEY POINTS

- Demonstrated statewide need: UST owners will find it increasingly difficult to obtain insurance due to the anticipated increase in the number of older tanks in the years ahead.
- There are no existing programs meeting the current needs of private UST owners.
- A loan-based program can meet the needs of tank owners unable to obtain private financing for cleanups, upgrades, and replacement.
- A revolving loan program would provide tank owners and operators with loans to:
 - Clean up historical or ongoing contamination caused by leaking tanks.
 - Replace or upgrade aging fuel systems to prevent leaks and to dispense alternate fuels demanded in the current market.
 - Help stations adapt to changing market conditions by allowing loans to include the installation of electric vehicle (EV) charging stations.
- As determined by policy and fiscal sustainability, a loan program can also feature incentives that replicate grants (such as principal forgiveness), making such a program more flexible than a grant-only program.
- Qualifying criteria for the loan program will be based on site and borrower characteristics, and will ensure the efficient and effective use of loan funds

7. Revolving Loan Program Analysis

This section examines the feasibility of using a revolving loan program to finance private petroleum UST owners or operators seeking to upgrade or replace existing infrastructure or clean up contaminated sites. The need for an revolving loan program assumes that private bank loans are not available due to the current state of most UST properties lacking suitability as a secured asset with known economic value. Five issues are addressed in this section. First, the funding source for the revolving loan fund is evaluated for its ability to generate the needed revenue. Second, the potential demand for loans, and how this demand is likely to change over the next 20 years is examined. Third, operational parameters of the loan program, such as interest rates and annual loan amounts, are identified. Fourth, three operational definitions of ‘self-sufficiency’ are defined. Finally, guidance is provided on how altering the operational parameters of a petroleum UST revolving loan program impact the ability to achieve the three levels of self-sufficiency.

Funding source: Petroleum Products Tax

A revolving loan program would be funded from the Petroleum Products Tax. The PPT currently funds the Pollution Liability Trust Account, which covers claims for the Commercial UST Reinsurance Program and – due to insufficient revenues from the heating oil tax – is also the primary funding source for the Heating Oil Tanks Program. FY 2015 claims under these two programs were \$3.2 million and \$5.9 million, respectively.

Revenues from the PPT flow into the Pollution Liability Trust Account. Interest earned on that account is transferred to the General Fund, in accordance with Chapter 43.79A.040 RCW. It should be noted that which funds have their interest transferred to the General Fund, and which are credited to the fund, in whole or in part, is also specified in Chapter 43.79A.040 RCW. Whether this will apply to the potential revolving loan program is another policy consideration.

Since it may be desirable to treat interest earned on funds in the Pollution Liability Trust Account differently from interest earned on funds associated with a revolving loan program, it is assumed that there is a separate trust account for the revolving loan program.

To evaluate the sufficiency of the PPT as the revenue source to fund and potentially sustain a revolving loan program – or even a pure grant program – prior PPT revenues were compared to several demographic and economic variables. The best relationship was found between the real (inflation adjusted) taxable value of petroleum products and the state population. For the infrequent time periods when the PPT has been imposed, the taxable value of petroleum products has averaged \$2485 per capita in 2014 dollars. This was found to be more consistent than using Washington’s gross domestic product (GDP) as a predictor.¹⁶ State population growth is also easier to forecast than state GDP, which further simplified the analysis.

Potential current revenue from the PPT is estimated at \$50 million per year. Potential future PPT revenue is projected to grow to approximately \$75 million in current dollars (\$57.5 million in 2014 dollars) by FY 2030, based on recent trends in population growth and inflation (0.9 percent and 2.2 percent, respectively). Even at zero population growth and no inflation for the next fifteen years, revenues from the PPT would be adequate to fund PLIA’s reinsurance activities and the revolving loan program. This revenue-generating capacity may also permit a reduction of the PPT if desired.

¹⁶ The coefficient of variation was used to select between using population and state GDP. The coefficient of variation is calculated by dividing the standard deviation by the mean, and multiplying by 100. The coefficient of variation was 5.6% for petroleum products taxable value per capita, and 14.9% for petroleum products taxable value per GDP.

Based on current claims, expected changes to those claims, and the likely dollar amount of loans, the PPT revenue is sufficient to cover the revolving loan program, Commercial UST Reinsurance Program, and the Heating Oil Tank Program for the foreseeable future, including the next 20 years. This conclusion also holds for periods when oil prices are unusually low, as is the current case. Given that the PPT is a relatively robust revenue source, no other sources (such as capital bonds) were evaluated to check for short- or long-term sufficiency as a funding source.

The demand for loans

One of the key drivers making it difficult or impossible for petroleum UST owners or operators to obtain insurance is the age of their tanks. Tank warranties are typically 30 years, so tanks older than 30 years are more difficult to insure. At the same time, older tanks are more likely to have insurance policies with retroactive dates that leave gaps in their liability coverage. Banks are unwilling to lend on these properties.

The age distribution of tanks can give an indication of how the demand for publicly-provided loans will change over the next fifteen years. **Table 7.1** gives the age distribution for privately owned commercial petroleum USTs that were listed as operational by the Department of Ecology, as of September 2015. Government-owned tanks were excluded from the distribution, though their age distribution is very similar to the privately owned tanks. The distribution is given for all tanks, as well as for the oldest tank at each UST site. The latter distribution is most relevant for insurance purposes, as insurance is for the entire UST site, and loans would be for a site, not for individual tanks. The data was compiled using publicly available information from the Washington State Department of Ecology (2015b).

There are several facts worth noting. First, of the 22.6 percent of tanks that are over 30 years old, more than half reached the critical 30-year age within the past five years. Second, the number of tanks surpassing the 30-year threshold will double over the next five years as the 25-30 age group transition to become the 30-35 year age group. Third, the number of tanks at least 30 years old will more than triple within ten years, and nearly quadruple within 15 years.

The distribution of the age of the oldest tank at each UST site tells a similar story, with the number of such sites doubling in five years, more than tripling in ten years, and more than quadrupling in fifteen years.

Many of the younger tanks are those installed over the last 15 years at hypermarkets. As such, their owners have more financial resources, compared to the owners of the older tanks, which skew more towards the ‘mom and pop’ type operation.

From these age distributions it is clear that the current indicators of increased premiums and cancelled policies is just the beginning of an aging infrastructure problem that is likely to grow for the next fifteen years, after which the growth rate should abate.

Table 7.1. Age distribution of commercial, non-government, petroleum underground storage tanks (USTs), by tank and by oldest tank at each UST site, as of September 2015.

Age range (years)	Distribution by tank age		Distribution by age of oldest tank at UST site	
	Number of tanks	Percent of total	Number of sites	Percent of total
0-5	240	3.1%	99	3.3%
5-10	316	4.0%	149	5.0%
10-15	427	5.4%	214	7.2%
15-20	1,336	17.0%	620	20.7%
20-25	1,967	25.0%	750	25.1%
25-30	1,797	22.9%	605	20.2%
30-35	895	11.4%	267	8.9%
35+	876	11.2%	287	9.6%
Total	7,854	100%	2,991	100%

Source: derived from data obtained from Washington State Department of Ecology (2015b).

Revolving loan program parameters

While there are many design and policy parameters to consider in structuring a revolving loan program, eight were deemed critical to evaluating the financial soundness of the program over the next 15 years. As with other program design details, these parameters will be identified and finalized through the public engagement process based around rule development. They are, in no particular order:

- Number and dollar values of loans.
- Length of loans.
- Interest rate of loans.
- Default rate and time to default.
- Proportion of funds issued as grants or principal forgiveness.
- Indirect cost charges (6-8%).
- Whether loan amounts are increased with inflation.
- Whether early repayment of principal is added to the pool for new loans.
- Whether interest earned on a dedicated account funding the loans is retained in the revolving loan program trust account, or transferred to the General Fund.

Self-sufficiency of a revolving loan program

The self-sufficiency, or sustainability, of a revolving loan program is determined by whether the interest earned on the portfolio of loans is sufficient to cover a defined set of costs. The self-sufficiency of a revolving loan program can be important to its long-run effectiveness and to its acceptability to key stakeholder groups. As an indicator of the growing importance of this topic, the United States Government Accountability Office recently completed a study examining the sustainability – or lack thereof – of state revolving loan funds tied to the EPA’s Clean Water and Drinking State Revolving Funds (SRF) programs (GAO 2015).

Loosely defined, self-sufficiency means that a loan program generates sufficient revenue to eliminate the need for any infusion of additional funds. This study defines two levels of self-sufficiency:

Fund-level self-sufficiency: Ability of the revolving loan program to generate enough interest income to finance new loans, and pay any fees to an implementing agency to cover their indirect costs. Fund-level self-sufficiency would still require minor transfers from the Pollution Liability Insurance Trust Account to fund any increases in operating costs directly or indirectly due to a revolving loan program.

Program-level self-sufficiency: This level is only slightly more stringent than fund-level sufficiency. It includes the ability to cover all of the expenses identified for fund-level self-sufficiency. In addition, all incremental PLIA operating costs associated with the revolving loan program, such as the addition of full time employees, are added to the expenditures that must be covered. Achieving self-sufficiency at this level is the threshold for the revolving loan program to not need any additional infusions of revenue.

Evaluation of the potential for self-sufficiency

An Excel spreadsheet model was developed to evaluate the potential for a revolving loan program to achieve self-sufficiency. The model included the design and policy parameters identified above.

The factors impacting the two levels of self-sufficiency are shown in **Table 7.2**.

Table 7.2. Factors affecting the self-sufficiency of a revolving loan program.

Program Design/Policy Parameter	Self-Sufficiency Level	
	Fund-level	Program-level
Dollar value of loans per biennium	Minimal impact	Somewhat important
Length of loans	Shorter loans support self-sufficiency	Varies, depending on dollar value of loans
Interest rate	Higher interest rates support self-sufficiency in all cases	
Default rate	Lower default rates or grant/principal forgiveness percentages support self-sufficiency	
Proportion of funds issued as grants or principal forgiveness		
Indirect cost charges	Lower indirect cost charges support self-sufficiency	
Whether loan amounts are increased with inflation	Delays self-sufficiency, but if the increase is capped at a nominal dollar amount it can support earlier self-sufficiency	
Whether interest earned on loans rolls over into loan program trust account vs. being transferred to the General Fund	Necessary for all levels of self-sufficiency	

For purposes of discussing self-sufficiency, four parameters or groups of parameters were found to be key:

- Grants, defaults, and principal forgiveness are similar, both in concept and in how they affect self-sufficiency, so they can be thought of as one set of parameters. The percentage charged for indirect costs also enters the model in a manner similar to these variables.
- Annual default rates for commercial loans to gasoline stations have ranged from less than one percent to more than four percent in the Western United States over the last four years. As the proposed program is a relatively new concept, and the characteristics of potential borrowers unknown, default rates will be presumed to fall along the high end of the range reported above.
- The number of loans issued can influence the operating cost of the program, but the more important factor is the total dollar value of all loans.
- The length of loans issued is particularly important.
- Interest rates are, of course, important for generating revenue, which supports self-sufficiency. For illustrative purposes, the financial model uses rates of 5 percent and 8 percent over a range of scenarios.

The factors favoring fund-level self-sufficiency include shorter-term loans (e.g., 5 years vs. 10 years), higher interest rates (holding term length constant), lower grant percentage, lower default rates, and a lower indirect cost percentage. Fund-level self-sufficiency is not particularly sensitive to the dollar amount of loans when operating costs do not increase with the loan program. But if the loan program must support several full-time employees (FTEs), then higher loan amounts are needed to achieve program-level self-sufficiency. These higher loan amounts, and more loans in general, also influence the need for additional FTEs.

For program-level self-sufficiency it is useful to think in terms of the size of a ‘loan portfolio’ needed to generate revenue to cover costs unrelated to the loan program. A larger loan portfolio generates more interest income for a given interest rate and loan default rate, making it easier to support self-sufficiency at an earlier date.

Factors that help achieve program-level self-sufficiency include shorter term loans, but only to an extent. If loans periods are made too short, it becomes difficult for the loan portfolio to generate the needed interest income to achieve self-sufficiency. Higher aggregate dollar loan amounts also aid achieving self-sufficiency.

There is a cap on the potential time to self-sufficiency. For example, if all loans are 20-year loans, and annual loan amounts are fixed in nominal dollars, then self-sufficiency, if it is possible, must be reached in that 20-year period, unless future claims costs are falling in nominal dollars or are reduced intentionally by PLIA.

Cash Flow Projections

Examples of expected cash flow under four scenarios can be found below. The scenarios differ by the interest rate and the length of the loans. Net cash flows, as delineated by fund-level or program-level, self-sufficiency are presented, along with a forecast for the potential revenue that could be generated by the Petroleum Products Tax.

The net cash flow generated by a revolving loan program depends on many variables. This section illustrates four scenarios where the interest rates and length of loans have been varied, but other variables have been held constant.

The constant variables, or common assumptions, in all four scenarios are:

- Assumptions underlying estimates of potential revenue from Petroleum Products Tax
 - PPT tax rate: 0.003 (0.3%), though a range can be supported
 - Inflation: 2.2%
 - Population growth: 0.9%
 - Taxable petroleum products value per capita (2014 dollars): \$2,485
- Budget assumptions
 - Incremental increase in PLIA capital budget for 3 FTEs: \$450,000
 - Budget inflator: 2.5%
- Commercial UST and Heating Oil Tank claims assumptions
 - No change in the nominal value of these claims from current levels
- Revolving Loan Program assumptions
 - Annual loans issued, net of program and contract management: \$9,000,000
 - Annual growth in loans: 0%
 - Indirect overhead percentage for implementing agency: 7%
 - Grants, principal forgiveness and defaults as percent of annual loans: 11.1%

The four scenarios modeled vary in the interest rate (r) and loan length, with following scenarios:

- Scenario 1: $r = 8\%$; loan length = 30 years
- Scenario 2: $r = 8\%$; loan length = 10 years
- Scenario 3: $r = 5\%$; loan length = 30 years
- Scenario 4: $r = 5\%$; loan length = 10 years
- Scenario 5: $r = 3.5\%$; loan length = 30 years
- Scenario 6: $r = 3.5\%$; loan length = 10 years

Each scenario calculates the expected net cash flow, as defined for each of two levels of self-sufficiency:

- Fund-level self-sufficiency
- Program-level self-sufficiency

Results are shown in **Table 7.3** for years 1 through 5, and years 10, 15, and 20. Year 1 is assumed to be Fiscal Year 2017.

Fund-level and program-level net cash flows are relatively similar, only differing by the incremental costs of adding three FTEs. A more aggressive cleanup of existing contaminated sites can increase the needed cash from the PPT in the earlier years, but decrease it in later years.

Table 7.3: Net cash flow for four scenarios; nominal dollars.

Fund level self-sufficiency test:	Net cash inflow (outflow) from revolving loan program							
Program level self-sufficiency test:	Net cash inflow (outflow) from revolving loan program + incremental program costs							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15	Year 20
	(Millions of dollars)							
Potential Revenue from PPT (same for all scenarios)	\$56.51	\$58.39	\$60.32	\$62.31	\$64.35	\$75.44	\$88.01	\$102.09
Scenario 1: r = 8%; loan term = 30 years								
Fund level self-sufficiency	\$10.63	\$9.83	\$9.03	\$8.23	\$7.43	\$3.43	(\$0.56)	(\$4.56)
Program level self-sufficiency	\$11.08	\$10.29	\$9.50	\$8.72	\$7.93	\$4.00	\$0.07	(\$3.84)
Scenario 2: r = 8%; loan term = 10 years								
Fund level self-sufficiency	\$10.63	\$9.29	\$7.95	\$6.61	\$5.26	(\$1.44)	(\$2.78)	(\$2.78)
Program level self-sufficiency	\$11.08	\$9.75	\$8.42	\$7.09	\$5.76	(\$0.88)	(\$2.15)	(\$2.06)
Scenario 3: r = 5%; loan term = 30 years								
Fund level self-sufficiency	\$10.63	\$10.04	\$9.46	\$8.87	\$8.29	\$5.36	\$2.43	(\$0.49)
Program level self-sufficiency	\$11.08	\$10.51	\$9.93	\$9.36	\$8.78	\$5.92	\$3.07	\$0.23
Scenario 4: r = 5%; loan term = 10 years								
Fund level self-sufficiency	\$10.63	\$9.46	\$8.30	\$7.13	\$5.97	\$0.14	(\$1.03)	(\$1.03)
Program level self-sufficiency	\$11.08	\$9.93	\$8.77	\$7.62	\$6.46	\$0.70	(\$0.39)	(\$0.31)
Scenario 5: r = 3.5%; loan term = 30 years								
Fund level self-sufficiency	\$10.63	\$10.14	\$9.65	\$9.16	\$8.67	\$6.23	\$3.78	\$1.33
Program level self-sufficiency	\$11.08	\$10.60	\$10.12	\$9.65	\$9.17	\$6.79	\$4.42	\$2.05
Scenario 6: r = 3.5%; loan term = 10 years								
Fund level self-sufficiency	\$10.63	\$9.55	\$8.47	\$7.38	\$6.30	\$0.89	(\$0.19)	(\$0.19)
Program level self-sufficiency	\$11.08	\$10.01	\$8.94	\$7.87	\$6.80	\$1.45	\$0.44	\$0.53

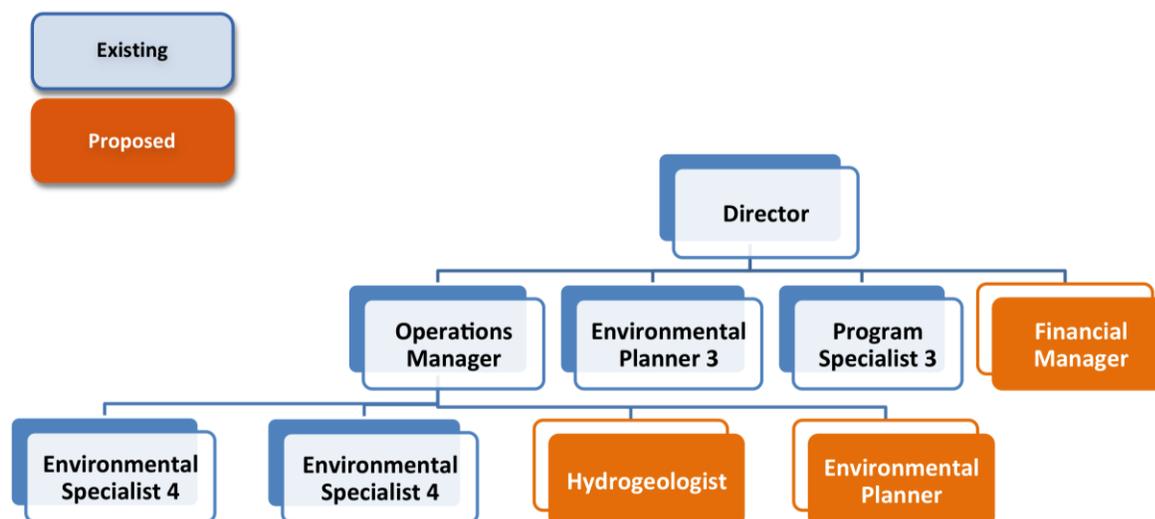
KEY POINTS

- A revolving loan program could be adequately funded with the existing Petroleum Products Tax.
- The potential demand for loans is expected to increase substantially in the next 5-15 years as more USTs surpass the 25 years old mark.
- Fund-level self-sufficiency, where the interest earnings from loans provides the capital for new loans, is relatively easy to achieve, so long as interest rates are adequate, and grant, principal forgiveness, and default rates are sufficiently low.
- Program-level self-sufficiency, where the interest earnings cover the incremental operating costs of the loan program, including new personnel, is aided by lending more, allowing PLIA to have a larger loan portfolio.

8. Staffing Model Analysis

PLIA currently operates with a Director and 5 full-time staff members, as shown in **Figure 8.1**, below. Proposed new positions are also included in this chart, and are discussed in more detail below.

Figure 8.1. PLIA organization chart, October 2015.



Staffing Requirements for New Program Activities

To ensure the activities funded by a revolving loan will proceed in a timely and effective manner, loan applications will need to be evaluated on rigorous technical, financial, and community benefit criteria to determine the likelihood of a successful cleanup. In addition, the technical nature of the funded projects will require monitoring to ensure activities remain on track toward closure. Finally, there will be a need for financial management expertise to maintain program funding targets and lending capabilities.

The state of Washington *Guide to Developing Strategic Workforce Plans* describes a four-step planning model to be used after an agency completes its strategic planning process. While this report is intended to deal only with the additional workload related to the initiation of a revolving loan program, the workforce planning model provides some structure to the analysis. The four steps include:

- Workforce Issues
- Workforce Goals
- Workforce Objective
- Workforce Strategies

These steps follow from the organization's strategic goals and objectives, in this case, the implementation of a new financial assistance program.

The primary workforce issue is that current staff capacity is strained and cannot assume the additional responsibilities associated with the new business service. As demonstrated above, workloads (as measured by claims processed) have increased while staffing levels have declined. While this is an indicator of increased efficiency, there are limits to the workload that can be added to the organization without additional personnel.

The workforce goal in question is the need to support the establishment, implementation and growth of a new financial assistance program. This requires a combination of specialized experience in site remediation as well as financial management that PLIA does not currently possess.

The primary workforce objective is to maintain the staff capacity to administer the new financial assistance program, including the rulemaking process and implementation of a financial assistance program by July 2017, with the first set of loans to be awarded by December 2017.

Workforce strategies will focus on organizational development: recruiting and hiring the three FTE positions described below.

New position: Hydrogeologist

This position supports the agency mission by performing senior level technical oversight on cleanup projects relating to the agency's underground storage tank revolving loan program. The hydrogeologist will be the recognized authority in groundwater modeling and data management, as well as monitoring and assessing policy development. The hydrogeologist will support policy and budget development, and provide expert testimony before bodies such as the legislature, courts, and hearings boards on complex groundwater and vapor contaminated issues concerning PLIA revolving loan program sites. The hydrogeologist will assist with rule-making during initial program development.

New position: Environmental Planner

This position supports the program by performing senior level work for the underground storage tank (UST) revolving loan program. The planner will provide planning assistance, contract management, expertise, outreach consultation, and rule-writing for the revolving loan program. The planner will market the revolving loan program to prospective applicants, coordinate with property owners, communicate and engage surrounding community, and collaborate with the implementing agency to assess loan applications. The planner will collaborate with other federal, state, local agencies and industry representatives on rule-making for the loan program. The planner will provide assistance to loan applicants for leveraging insurance and settlement funds.

New position: Financial Manager

This position is responsible for the sound financial management of the revolving loan program and will serve as the primary point of contact for all program-related budget and financial matters. The manager will administer and oversee financial activities, including cash flow modeling to ensure sustainability of the loan fund, work with the Department of Health to establish interest rates for loan recipients as well as the appropriate rate of repayments. The manager will use this information to determine the amount of principal forgiveness dollars available each year for underground storage tank revolving loan projects. The manager will oversee the interagency agreement with the Department of Health for program administration and must ensure that all program activities are carried out in accordance with agency policies and procedures, and state and federal laws that govern the program's activities. The manager is lead in working with state auditors to ensure state funds are spent appropriately both within the program, and for randomly selected loan recipients. The

manager will prepare capital budget requests and carry out all capital budget activities for the program. The manager will coordinate and oversee the preparation of required reports to the Governor or Legislature.

KEY POINTS

- PLIA's workload has increased over the past 20 years, while the staffing level has been reduced.
- Proposed loan program will increase agency workload and requires specialized knowledge and expertise.
- An additional 3 FTE positions are proposed:
 - Hydrogeologist to assess sites and ensure cleanup activities are being performed according to best practices.
 - Environmental Planner to design and administer the program.
 - Financial Manager to review loans, provide ongoing support to capital budgeting and financial operations.

References

- Abdalla, C.W. 1990. "Measuring economic losses from ground water contamination: And investigation of household avoidance costs." *Journal of the American Water Resources Association*, 26: 451–463.
- Association of State and Territorial Solid Waste Management Officials (ASTSWMO). 2014. Compendium of Emergency Response Actions at Underground Storage Tank Sites. Version 2. July 2014.
- Association of State and Territorial Solid Waste Management Officials (ASTSWMO). 2015a. "ASTSWMO Aging Tanks Workgroup." Draft Report. September 2015.
- Association of State and Territorial Solid Waste Management Officials (ASTSWMO). 2015b. "State Fund Survey Results, Table 1 (Part 2). Design Characteristics of State Financial Assurance Funds 2014." [astswmo.org](http://www.astswmo.org).
http://www.astswmo.org/Pages/Policies_and_Publications/Tanks.htm (accessed September 27, 2015).
- California State Water Resources Control Board. 2000. "Should Petroleum Equipment Remain in Operation Forever?" Just UST News. Issue No. 1 (Fall 2000).
- Case, B., P. F. Colwell, C. Leishman and C. Watkins. 2006. "The Impact of Environmental Contamination on Condo Prices: A Hybrid Repeat-Sale/Hedonic Approach." *Real Estate Economics* 34(1): 77-107.
- Davis, L.W. 2004. "The Effect of Health Risk on Housing Values: Evidence from a Cancer Cluster." *American Economic Review* 94: 1693-1704.
- Depro, Brooks, Dallas Wood, Kelly Jones, and Sumeet Patil. 2007. "Economic Impact Analysis for the Gasoline Distribution Industry (Area Sources)." Report prepared for Tom Walton, U.S. Environmental Protection Agency.
- DriveBiodiesel.net. 2015. "Washington Biodiesel Locations." [Drivebiodiesel.net](http://www.drivebiodiesel.net).
<http://www.drivebiodiesel.net/State/WashingtonBiodiesel.html> (accessed September 29, 2015).
- E85Locator.net. 2015. "Washington E85 Gasoline stations." [E85.net](http://www.e85locator.net).
<http://www.e85locator.net/State%20Pages/WashingtonE85stationlocations.html> (accessed September 29, 2015).
- Fischhoff, B. 2001. *Defining Stigma. Risk, Media, and Stigma*. Ed. James Flynn, Paul Slovic, and Howard Kunreuther. London: Earthscan Publications. 361-368.
- Florida Department of Environmental Protection. 2012. "Ethanol Storage in Underground and Aboveground Storage Systems...What Owners Should Know." from:
https://www.dep.state.fl.us/waste/quick_topics/publications/pss/tanks/ethanol/EthanolStorageinUSTandAST.pdf Retrieved September 28, 2015
- Gayer, T., J.T. Hamilton, and W.K. Viscusi. 2000. "Private Values of Risk Tradeoffs at Superfund Sites: Housing Market Evidence on Learning about Risk." *Review of Economics and Statistics* 82(3): 439-451.

- Greenberg, M., D. Downton, and H. Mayer. 2003. "Are Mothballed Brownfield Sites a Major Problem?" *Public Management* 85(5): 12-17.
- Guignet, Dennis. 2013. "What do property values really tell us? a hedonic study of underground storage tanks." *Land Economics* 89, no. 2: 211-226.
- Guignet, Dennis. 2014. *To Sell Or Not To Sell: The Impacts of Pollution on Home Transactions*. No. 201401. National Center for Environmental Economics, U.S. Environmental Protection Agency.
- Heineman, Hannah. 2011. "Santa Monica Declares Water Self Dependence." *Santa Monica Mirror*. February 24, 2011. <http://www.smmirror.com/articles/News/Santa-Monica-Declares-Water-Self-Dependence/31826>
- Jackson, T.O. 2001. "The Effects of Environmental Contamination on Real Estate: A Literature Review." *Journal of Real Estate Literature*, 9:2, pp. 93–116.
- Jenkins, R., E. Kopits, and D. Simpson. 2006. *Measuring the Social Benefits of EPA Land Cleanup and Reuse Programs*. NCEE Working Paper 06-03.
- Lee, Sang-Yeob. 2007. *Spatial competition in the retail gasoline market: An equilibrium approach using SAR models*. Working paper, Ohio State University.
- Messer, K., W. Schulze, K. Hackett, T. Cameron, and G. McClelland. 2006. "Can Stigma Explain Large Property Value Losses? The Psychology and Economics of Superfund." *Environmental and Resource Economics* 33: 299-324.
- National Research Council . 1997. *Valuing Ground Water: Economic Concepts and Approaches*. Committee on Valuing Ground Water, National Research Council, Division on Earth and Life Studies, Commission on Geosciences, Environment and Resources. National Academies Press, Jul 10, 1997
- National Water Research Institute. 2001. *Treatment Technologies for the Removal of Methyl Tertiary Butyl Ether (MTBE) from Drinking Water: Air Stripping, Advanced Oxidation Processes, Granular Activated Carbon, Synthetic Resin Sorbents*. Second Edition.
- Pollution Liability Insurance Agency. 2015. "Welcome to PLIA." [PLIA.wa.gov](http://www.plia.wa.gov). <http://www.plia.wa.gov/#Mission> (accessed September 27, 2015).
- Pollution Liability Insurance Agency. 2015. "Pollution Loan Innovation Act." Draft legislative proposal.
- Revised Code of Washington 70.148. *Underground Petroleum Storage Tanks*.
- Simons, R. 2006. *When Bad Things Happen to Good Property*. Washington D.C.: Environmental Law Institute.
- Simons, R.A. and Sementelli, A.J. 1997. "Liquidity Loss and Delayed Transactions with Leaking Underground Storage Tanks." *The Appraisal Journal*. 65(3): 255-260.

- Simons, R., W. Bowen, and A. Sementelli. 1997. "The Effect of Underground Storage Tanks on Residential Property Values in Cuyahoga County, Ohio." *Journal of Real Estate Research* 14(1): 29-42.
- Simons, R., W. Bowen, and A. Sementelli. 1999. "The Price and Liquidity Effects of UST Leaks from Gasoline stations on Adjacent Contaminated Property." *The Appraisal Journal* 67(2): 186-94.
- U.S. Census Bureau. 2015a. "Gasoline Stations (NAICS 4471)." http://thedataweb.rm.census.gov/TheDataWeb_HotReport2/econsnapshot/2012/snapshott.html?NAICS=4471 (accessed September 22, 2015).
- U.S. Census Bureau. 2015b. "Gasoline Stations with Convenience Stores (NAICS 447110)." http://thedataweb.rm.census.gov/TheDataWeb_HotReport2/econsnapshot/2012/snapshott.html?NAICS=447110 (accessed September 22, 2015).
- U.S. Department of Energy. 2015a. "Alternative Fuel Stations." [afdc.energy.gov](http://www.afdc.energy.gov). http://www.afdc.energy.gov/data_download/alt_fuel_stations_format (accessed September 29, 2015).
- U.S. Department of Energy. 2015b. "Flexible Fuel Vehicles." [afdc.energy.gov](http://www.afdc.energy.gov). http://www.afdc.energy.gov/vehicles/flexible_fuel.html (accessed September 22, 2015).
- U.S. Department of Transportation. 2014. *Guidance on Treatment of the Economic Value of a Statistical Life (VSL) in U.S. Department of Transportation Analyses – 2014 Adjustment*. Office of Transportation Policy, Washington D.C.
- U.S. Environmental Protection Agency. 2000a. "Approaches to Assessing the Benefits, Costs, and Impacts of the Office of Underground Storage Tanks Cleanup Program." Draft Report Prepared for the U.S. Environmental Protection Agency, Office of Solid Waste, Prepared by Industrial Economics, Inc., Cambridge, MA.
- U.S. Environmental Protection Agency. 2000b. *Financial Responsibility for Underground Storage Tanks: A Reference Manual*, EPA 510-B-00-003, Washington, D.C.
- U.S. Environmental Protection Agency. 2010. *The Benefits and Costs of the Clean Air Act: 1990 to 2020*. Revised Draft Report. Office of Air and Radiation. Washington, D.C.
- U.S. Environmental Protection Agency. 2011. *EPA Study On The Effectiveness Of UST Insurance As A Financial Responsibility (FR) Mechanism*. Office of Underground Storage Tanks. EPA-510-R-11-005. Washington, DC
- U.S. Environmental Protection Agency. 2011a. *Handbook on the Benefits, Costs and Impacts of Land Cleanup and Reuse*. EPA 240–R-11-001. Washington, DC.
- U.S. Environmental Protection Agency. 2011b. *Assessment of the Potential Costs, Benefits, and Other Impacts of the Proposed Revisions to EPA’s Underground Storage Tank Regulations*. <http://www.epa.gov/oust/fedlaws/RIA.pdf>

- U.S. Environmental Protection Agency (EPA). 2011c. Appendices to Assessment of the Potential Costs, Benefits, and Other Impacts of the Proposed Revisions to EPA's Underground Storage Tank Regulations. <http://www.regulations.gov/#!documentDetail;D=EPA-HQ-UST-2011-0301-0192>
- U.S. Environmental Protection Agency. 2014. The National LUST Cleanup Backlog: A Study of Opportunities. State Summary Chapter: Washington State.
- U.S. Environmental Protection Agency. 2015a. Semiannual Report Of UST Performance Measures Mid Fiscal Year 2015 (October 1, 2014 - March 31, 2015). EPA.gov. <http://www2.epa.gov/sites/production/files/2015-07/documents/ca-15-12.pdf> (accessed September 23, 2015).
- U.S. Environmental Protection Agency. 2015b. State Financial Assurance Funds. EPA.gov. <http://www2.epa.gov/ust/state-financial-assurance-funds> (accessed September 27, 2015).
- U.S. Government Accountability Office. 2015. State Revolving Funds: Improved Financial Indicators Could Strengthen EPA Oversight, GAO-15-5672015. Washington, D.C.
- U.S. National Archives and Records Administration. 2015. Code of federal regulations. Title 40. Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST).
- Washington Administrative Code § 173-360-406 (1990). Amount and scope of required financial responsibility.
- Washington Revised Code § 70.148.030 (1989 & Supp. 1994). Pollution liability insurance program - Generally -- Ad hoc committees.
- Washington State Department of Ecology. 2009. Leaking Underground Storage Tank (LUST) Sites Near Sensitive Wellheads. Ecology Publication No. 09-09-048.
- Washington State Department of Ecology. 2014. "LUST Site Age." Internal PowerPoint presentation, April 2014.
- Washington State Department of Ecology. 2015a. Leaking Underground Storage Tanks List. <https://fortress.wa.gov/ecy/tcpwebreporting/report.aspx> (accessed September 12, 2015).
- Washington State Department of Ecology. 2015b. Regulated USTs, Active Facilities. <https://fortress.wa.gov/ecy/tcpwebreporting/report.aspx> (accessed September 12, 2015).
- Washington State Department of Revenue. 2002–2008. Property Tax Statistics, Locally Assessed Valuation of Real Property by County, Table 22, Commercial Establishments.
- Washington State Treasurer. Various Years. "Annual Reports." Tre.wa.gov. <http://www.tre.wa.gov/aboutUs/publications/annualReports.shtml> (Accessed September 12, 2015).
- Zabel, Jeffrey E., and Dennis Guignet. 2012. "A hedonic analysis of the impact of LUST sites on house prices." *Resource and Energy Economics* 34, no. 4: 549-564.

Appendices

Appendix A: Legal Opinion of Revolving Loan Program



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Ecology Division
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INTERNAL ADVICE MEMORANDUM

DATE: September 30, 2015

TO: Russell E. Olsen
Director, Pollution Liability Insurance Agency

FROM: Ivy Anderson,
Assistant Attorney General, Ecology Division

SUBJECT: Review of the Pollution Liability Insurance Agency's Proposed Legislation

I. ISSUE

Does the Pollution Liability Insurance Agency's proposed legislation create an unconstitutional gift of public funds to private entities?¹

II. SHORT ANSWER

Article VIII, section 5 of the Washington State Constitution states: "The credit of the state shall not, in any manner be given or loaned to, or in aid of, any individual, association, company or corporation." The purpose of the provision is to "prevent state funds from being used to benefit private interests where the public interest is not primarily served." *CLEAN v. State*, 130 Wn.2d 782, 797 (1996).

Implementation of the PLIA legislation would carry out a fundamental purpose of government by addressing or preventing harm to the environment, including drinking water, and public health. These activities would also create jobs, stimulate the economy and result in continued use or reuse of industrial property. Therefore the PLIA legislation would not be considered a gift of public funds. If a court were to find the PLIA

¹ While this memo represents my considered legal judgment, it is not a formal Attorney General Opinion and does not necessarily reflect the opinion of the Attorney General himself.

legislation did not carry out a fundamental purpose of government, there is still no gift of public funds because there is no donative intent and PLIA receives consideration.

III. DISCUSSION

1. Background on Proposed Legislation

The proposed Pollution Liability Insurance Agency (PLIA) legislation seeks to address the aging fuel distribution infrastructure in the state and associated releases of petroleum into the environment. Failure to replace and upgrade fuel distribution infrastructure could result in environmental damage and risk to public health and safety. The legislation also addresses the need to invest in new or retrofitted fuel distribution infrastructure to disperse renewable or alternative energy (e.g., electric vehicle charging stations).

The PLIA legislation will establish a revolving loan program under which PLIA will provide grant funds under an agreement to a non-profit lender who will provide a loan to owners and operators of petroleum underground storage tank (UST) systems to: (1) remediate past releases of petroleum into the environment; (2) upgrade, replace or remove petroleum UST systems; or (3) install new infrastructure or retrofit existing infrastructure for the dispersal of renewable or alternative energy. PLIA may require repayment of any grant after termination of the agreement, and the attorney general is given authority to bring any action necessary to secure repayment of the grant funds.

It is my understanding, that the PLIA legislation may be revised to have the Washington State Department of Health (DOH) administer the loans while operating under an agreement with PLIA. The loan to owners and operators of petroleum UST systems would work the same way as described above.

The PLIA legislation also allows PLIA to conduct remedial actions to investigate and cleanup a release or threatened release of a hazardous substance at or affecting an underground storage tank facility. PLIA is given authority to file a lien on the property being cleaned up to recover the agency's remedial action costs.

2. Review of Constitutional Prohibition on Gift of Public Funds

The initial step in this review is to determine whether the transaction involves the transfer of money or property to a private individual, association, company or corporation, thus triggering a gift of public funds analysis. In the PLIA legislation there are two triggers which will require review: (1) the transfer of grant funds from PLIA to a non-profit lender, where the lender will then provide loans to owner/operators of petroleum UST systems; and (2) where PLIA conducts remedial actions to investigate and cleanup a release from an UST facility. If the DOH administers the loans, then the transfer of grant funds from PLIA to DOH would not trigger a review (because the money is moving between state agencies). However, the transfer of money from DOH in the form of loans to owner/operators of UST systems may trigger a review.

As the gift of public funds analysis was triggered, the next step is to determine if the agency activity is one of the recognized exceptions to the constitutional prohibitions, such as an intergovernmental transfer, necessary support for the poor and infirm, etc. It does not appear that a recognized exception would apply to the PLIA legislation, and therefore we continue with further analysis.

In determining whether a gift of public funds has taken place, the courts apply a two-part analysis. The first inquiry is whether the funds are being expended to carry out a fundamental purpose of government. If the answer to this question is yes, then there has been no gift of public funds. If the answer to the first inquiry is no, then the courts look to the consideration received by the governmental entity for the expenditure of public funds and the donative intent of the governmental entity to determine whether there has been a gift. If consideration has been received, then there has been no gift of public funds.

i. First Inquiry

The first inquiry will determine if the funds are being expended to carry out a fundamental purpose of government. The constitutional prohibition on gifts of public funds does not apply to recognized governmental functions. *See Citizens for Clean Air v. City of Spokane*, 114 Wash.2d 20, 39 (1990) (citing *In re Marriage of Johnson*, 96 Wn.2d 255, 262, 634 P.2d 877 (1981); *Department of Labor & Indus. v. Wendt*, 47 Wn. App. 427, 435, 735 P.2d 1334 (1987)).

The legislature has recognized that the public has a fundamental and inalienable right to a healthful environment. *See* RCW 70.105D.010(1). The legislature has also stated that it is in the public's interest to cleanup and reuse contaminated industrial properties in order to minimize industrial development pressures on undeveloped land. *See* RCW 70.105D.010(4).

For the PLIA legislation provision which provides grant funds to a non-profit lender for the purpose of providing loans to petroleum UST system operators, the funds are arguably being expended to carry out a fundamental purpose of government – the protection of human health and the environment. The same argument may be made when DOH administers the loans. The loans may be used for a limited number of activities. Those activities are all related to addressing or preventing environmental damage and risks to public health and safety caused by releases from petroleum UST systems. Providing those funds will also create jobs, stimulate the economy, result in continued use or reuse of industrial property, and improve the quality of life.

For the PLIA legislation provision which allows PLIA to conduct remedial actions at a UST facility, the funds to conduct that activity are expended to carry out a fundamental purpose of government – the protection of human health and the environment. The remedial action would directly assist in protecting human health and the environment.

Cleanup of hazardous waste, thus protecting human health and the environment, is likely to be viewed by a court as a fundamental purpose of government.

ii. *Second Inquiry*

Even if a court found that the funds are not being expended on a fundamental purpose of government, it may not be a gift of public funds. Next a court would focus on: (1) determining whether the governmental body had a donative intent; and (2) examining the consideration received by the public. *CLEAN v. State*, 130 Wn.2d 782, 798, 928 P.2d 1054 (1996). If PLIA does not intend to confer a gift and receives consideration, there is no gift of public funds.

For the first question, donative intent means intention by donor to divest itself over property absolutely and irrevocably. A gratuitous expenditure is one for which the public entity neither expects nor receives consideration. The courts have found that there would not be donative intent if the private benefit is merely incidental to the public benefit. *See City of Tacoma v. Taxpayers of Tacoma*, 108 Wn.2d 679, 705 (1987). “Aid to individuals is not absolutely prohibited under our law but is only improper where public money is used solely for private purposes.” *Id.* (quoting *State v. Ralph Williams’ N. W. Chrysler Plymouth, Inc.*, 82 Wn.2d 265, 277, 510 P.2d 233 (1973)).

For the PLIA legislation provision which provides grant funds to a non-profit lender for the purpose of providing loans to petroleum UST system operators, there is no donative intent. While the transfer of funds to the non-profit lender is called a grant, it is clear that PLIA may require that the grant funds be returned after termination of the agreement. The attorney general is provided authority to pursue any relief as necessary to obtain repayment of the grant funds. This language indicates that there is intent for the funds given to the non-profit lender to be returned to PLIA. For that intent to be clearer, I would suggest the PLIA legislation indicate that PLIA *will require* grant funds be returned; the language would be an absolute requirement instead of a conditional “may” requirement.

When DOH provides loans to owners and operators of UST systems, the lack of donative intent is even clearer. The legislation indicates this is a *loan program* – and by its very nature the funds provided will be paid back.

For the PLIA legislation provision which allows PLIA to conduct remedial actions at a UST facility, there is no donative intent. The PLIA legislation states that it is in the public interest for the agency to recover those remedial action costs. To facilitate cost recovery, PLIA is provided with authority to place a lien on the property on which the UST system is located. The cost recovery will prevent an UST facility owner or operator from gaining a financial windfall from increased land value resulting from the PLIA conducted remedial actions. This language indicates that there is no intent for the funds spent by PLIA in conducting remedial actions to be divested absolutely and irrevocably. To facilitate the cost recovery options available to PLIA, I would suggest adding an authority that the attorney general may bring any action as necessary to obtain repayment

of remedial action costs. This would increase PLIA's cost recovery options beyond just placing a lien on the UST facility property.

For the second question, reviewing the consideration received by the public, the courts will not closely scrutinize the consideration but will apply a legal sufficiency test. *Taxpayers of Tacoma*, 108 Wn.2d at 703. The concept of "consideration" means that the public would be receiving a comparable "benefit for the bargain" in return for the expenditure. If the consideration received is not "grossly inadequate" the courts will not analyze whether the public received consideration that was equal to the expenditure (e.g., a dollar-for-dollar consideration). Legal sufficiency is not a matter of comparative value, but is a matter of what will support the promise. The court will look to whether the benefits PLIA receives support the expenditure.

In *Taxpayers of Tacoma*, Tacoma's electric utility invested in energy conservation audits and paid for the installation of conservation measures on the private property of its ratepayers. The Washington Supreme Court found that despite the fact that the conservation measures benefitted individuals by decreasing their utility bills, the city did not act with donative intent. The Court found that any benefit received by individuals was incidental to the public benefit of meeting future power needs by using the energy saved through the conservation measures.

As in the *Taxpayers of Tacoma* case, private owners or operators of fuel distribution facilities may benefit from the PLIA legislation which provides loan funds to repair or replace petroleum UST systems and install renewable energy infrastructure. However, if the private benefit is merely incidental to the public benefit of those activities, there would not be a donative intent. In *Taxpayers of Tacoma*, the Court found that the consideration was not grossly inadequate, because the city demonstrated the number of kilowatts of electricity that were likely to be saved in the first year after installation of the conservation measures. *Id.* at 703-4. As in the *Taxpayers of Tacoma* case, PLIA could demonstrate the adequacy of consideration by analyzing the decreased risk of petroleum releases due to the replacement and upgrading of aged fuel distribution infrastructure in the state. As described above, there are other benefits provided by the PLIA legislation-funded activities such as: creation of jobs, stimulating the economy and continued use or reuse of industrial property.

As the PLIA legislation indicates there is no donative intent, and if PLIA can provide an analysis of the predicted public benefit (for example via the decreased risk of petroleum releases), then I do not believe the PLIA legislation would constitute a gift of public funds.

Appendix B: Program Design and Pilot Projects

1. EPA letter to Russ Olsen



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

OCT - 7 2014

OFFICE OF
COMPLIANCE AND ENFORCEMENT

Reply To: OCE-082

Mr. Russell E. Olsen
Director
Pollution Liability Insurance Agency
Washington State
P. O. Box 40930
Olympia, Washington 98504-0930

Re: PLIA Bill 2015 – Underground Storage Tank Revolving Loan Program

Dear Mr. Olsen:

The U.S. Environmental Protection Agency has received a copy of the Pollution Liability Insurance Agency's (PLIA) legislative proposal to assist owners and operators of underground storage tank (UST) systems to remediate past releases of petroleum, replace aging UST systems to prevent future releases, and install new infrastructure for the dispensing of renewable or alternative energy. If approved by the Washington State Legislature, your proposal would be consistent with EPA's national goals for the UST program, but would not require an EPA authorization, as is required for state funds approved as financial assurance mechanisms under 40 CFR 280.101.

As you know, the federal UST program has been delegated to the Washington State Department of Ecology (Ecology). EPA retains oversight of the program and tracks three key performance measures nationally: the rate of significant operational compliance; reducing the number of new releases each year; and cleaning up past releases. To support Washington's UST program and meet EPA's national objectives, EPA provides approximately \$470,000 in annual grant funding to Ecology for inspections and other preventative measures for increasing compliance rates. In addition, last year EPA provided a grant of \$765,000 to Ecology to assist in cleaning up past releases.

Across the country, states do not have funding to fully address historic releases at more than 77,000 sites, and compliance rates continue to vary from state to state. In 2011, EPA finalized a national backlog study with participation by eleven states, including Washington State, in an attempt to promote collaboration among EPA and state UST programs to accelerate the pace of cleanups. EPA has also proposed new UST regulations which would update and strengthen UST system operational requirements. Details of EPA's proposal can be found at <http://www.epa.gov/swerust1/fedlaws/proposedregs.html>.

It is EPA's understanding that a majority of UST owners and operators currently rely on PLIA's reinsurance program to meet federal and state financial responsibility requirements for eligible UST releases in Washington State. PLIA's proposed UST Revolving Loan Fund program would add another pathway to support owners and operators of UST systems in addressing historic releases, meeting operational compliance standards, and preventing new releases as older UST systems are upgraded. Many states provide dedicated funding for federally-regulated petroleum releases and have requested

EPA to designate that "state fund" as the mechanism that provides financial assurance as required under federal UST regulations or a federally-approved state equivalent. Your proposal would not constitute a state fund, and therefore would not require an EPA authorization.

However, if your proposal is approved and provided with dedicated funding, EPA would be happy to work with you to determine how EPA can best work with Ecology and PLIA in furthering our respective objectives for UST owners and operators.

Please contact Peter Contreras at 206-553-6708 if you have questions about this letter.

Sincerely,

A handwritten signature in black ink, appearing to read "Lauris C. Davies". The signature is written in a cursive style with a large initial "L" and "D".

Lauris C. Davies
Associate Director

cc: Mr. Tom Eaton
EPA Washington Operations Office

Mr. Jim Pendowski
Washington State Department of Ecology

2. Site Selection Criteria for Pilot Projects

Following the authorization of the pilot grant program in the 2015-2017 capital budget, three awards were made (according to the proviso language – see page 7 for complete text), following the process described in the timeline below:

Timeline

July 1, 2015	PLIA received appropriation.
July 14, 2015	Grant applications available.
August 17, 2015	Grants awarded.
Early Fall 2015	Infrastructure and cleanup work expected to begin.
October 1, 2015	Initial program design report submitted to the Governor and Legislature. Upon completion of pilot demonstration work, PLIA will submit a follow up report.

Of the 21 grant applications PLIA received, three sites were selected by the following criteria:

- Financial need: Based on document bank loan denial and Indipay analysis using tax returns submitted.
- Age of tank(s)
- Financial assurance method: Is the site’s financial assurance demonstrated through an insurance policy reinsured by PLIA?
- Community benefit: Based on distance to other fuel providers.
- Estimated project duration: Based on project readiness and estimated duration.
- Extent of existing contamination
- Environmental Justice: Based on EPA’s EJScreen screening and mapping tool
- Expressed desire to install EV charging infrastructure
- Currently open insurance claim

The three project sites and timelines for work are included below:

3. Pilot site descriptions and timelines

Acme Fuel Company, Olympia

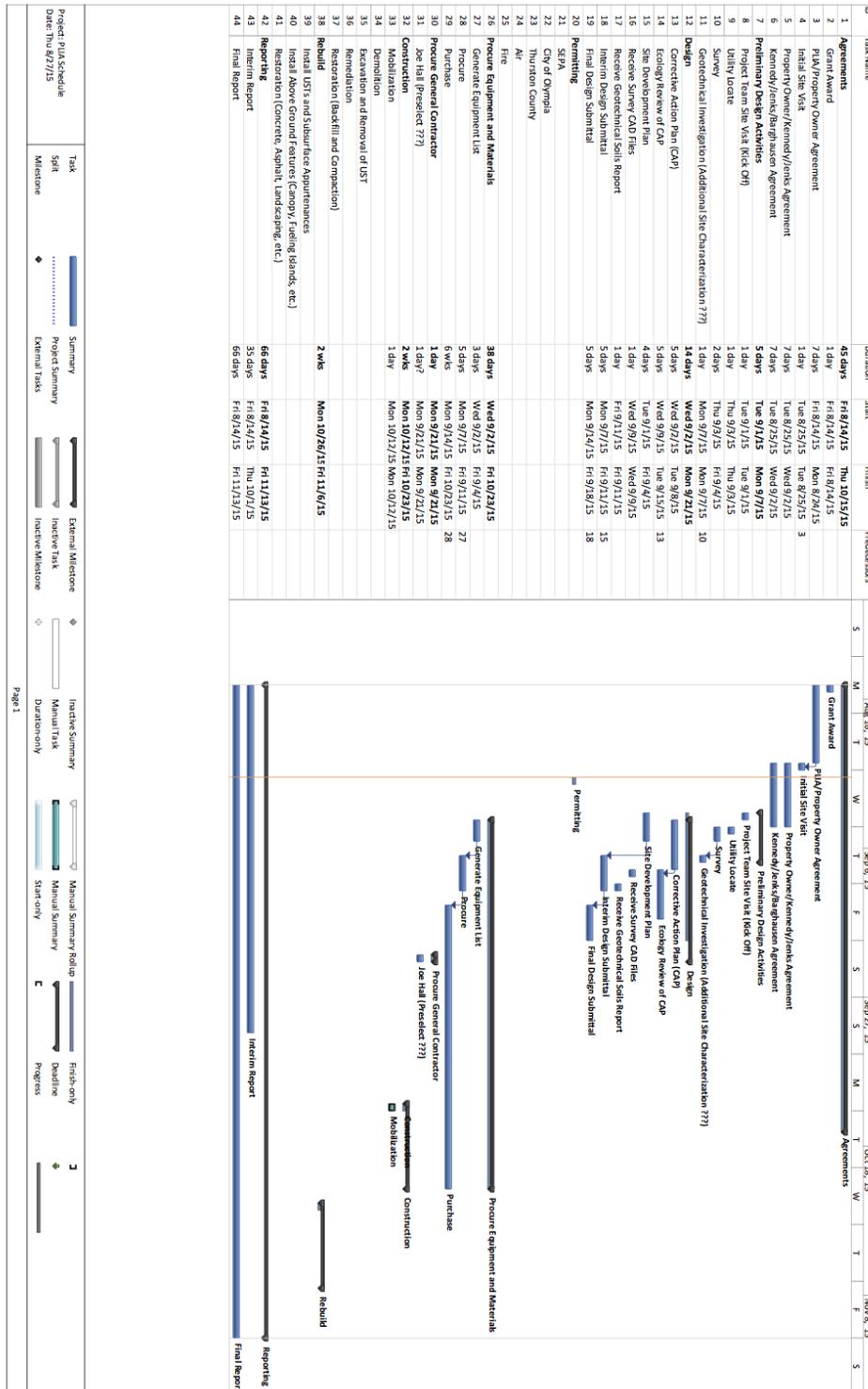
Size of award: Up to \$600,000 (funds to be disbursed at completion of project)

Background: In September 2011, 2,600 gallons of diesel was released during a delivery of fuel from a tanker truck to the larger above ground storage tanks (AST) that was in need of repair. The diesel fuel spilled out of the open manhole cover at the bottom of the AST. There is a pending settlement between Acme Fuel Company and the delivery contractor, Kenan Advantage Group, Inc. (KAG).

This is currently an underground storage tank claim insured by Great American. In February 2015, Great American was notified of a release from the UST system from a failed compression fitting under the dispenser on the diesel product line. Confirmation soil samples have indicated a diesel release in the areas near the diesel dispenser and above diesel tank. The consultant hired by the insured has prepared a cleanup plan with associated costs that needs to be reviewed and accepted by Great American and PLIA. In August 2015, a loan request to address outstanding issues was denied.

On August 19, 2015, Acme Fuel Company was awarded a grant from PLIA.

ACME Fuel Project Timeline



Genesee Fuel & Heating Co. Inc., Seattle

Size of award: Up to \$600,000 (funds to be disbursed at completion of project)

Background: Currently this business utilizes three underground storage tanks for the purpose refilling residential heating oil tanks. These tanks were installed in 1949 and 1955. The tanks have been insured by the same carrier and have a retro date of 1991.

In January 2015, Genesee was mailed a Notice of Cancellation by the insurance carrier. The reason for non-renewal was because this site does not fit company underwriting guidelines due to the age of the tanks.

In June 2015, the owner conducted due diligence by hiring an environmental consultant to take soil borings to confirm there was no petroleum contamination. The investigation concluded there is some petroleum impact to soil but the extent is known.

Genesee was awarded a grant from PLIA to remove and replace the underground storage tanks, remove petroleum contamination, and to install a Level 3 electric charging station.

Genesee has informed the insurance carrier of a potential claim regarding the underground storage tank system. The insurance carrier is in the investigation phase.

Genesee Project Timeline



Plans, Design, Permits, Contracting, Remediation, Confirmation, & Monitoring
Genesee Fuels Facility - 5720 Genesee Ave SE, Seattle

Printed: 9/25/15
Page 1 of 3

ID	Date	Assign Task Name	Start	Time	Finish	Links
0	Start	Genesee Oil - UST Project with Colony and PLIA 9-23-15	9/23/15	7:47	8/16/16	
1			9/23/15	7:47	12/18/15	
2						
3		Scoping, Discussions, Negotiations, Budgeting, Contracting - PRELIMINARY PLANS & FUNDING ALLOCATIONS				
3a		Project Scoping Meeting - Initiate Project Activities	9/23/15	0:4	9/23/15	
4		Work Search	9/23/15	3:4	9/23/15	
5		Work Search	9/23/15	4:4	9/23/15	
6		Work Search	9/23/15	4:4	9/23/15	
7		Work Search	9/23/15	3:4	9/23/15	
8		Work Search	9/23/15	7:4	10/8/15	
9		Work Search	9/23/15	7:4	10/8/15	
10		Work Search	9/23/15	7:4	10/8/15	
11		Work Search	9/23/15	7:4	10/8/15	
12		Work Search	9/23/15	7:4	10/8/15	
13		Work Search	9/23/15	7:4	10/8/15	
14		Work Search	9/23/15	7:4	10/8/15	
15		Work Search	9/23/15	7:4	10/8/15	
16		Work Search	9/23/15	7:4	10/8/15	
17		Work Search	9/23/15	7:4	10/8/15	
18		Work Search	9/23/15	7:4	10/8/15	
19		Work Search	9/23/15	7:4	10/8/15	
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40		Work Search	9/23/15	7:4	10/8/15	
41		Work Search	9/23/15	7:4	10/8/15	
42		Work Search	9/23/15	7:4	10/8/15	
43		Work Search	9/23/15	7:4	10/8/15	
44		Work Search	9/23/15	7:4	10/8/15	
45		Work Search	9/23/15	7:4	10/8/15	
46		Work Search	9/23/15	7:4	10/8/15	
47		Work Search	9/23/15	7:4	10/8/15	
48		Work Search	9/23/15	7:4	10/8/15	
49		Work Search	9/23/15	7:4	10/8/15	
50		Work Search	9/23/15	7:4	10/8/15	
51		Work Search	9/23/15	7:4	10/8/15	
52		Work Search	9/23/15	7:4	10/8/15	

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**Project Conceptual Timeline
Plans, Design, Permits, Contracting, Remediation, Confirmation, & Monitoring
Genesee Fuels Facility - 5720 Genesee Ave SE, Seattle**

Printed: 9/25/15
Page 3 of 3

ID	Date	Assign/Task Name	Start	Time	Finish	Links	Notes	September 2015	October 2015	November 2015	December 2015	January 2016	February 2016
108	9/25/15	SC1 - Install Power Supply for Charging Station	9/25/15	2 d	9/25/15	108	8/24/15 15:36	9/25/15	10/1/15	10/15/15	10/22/15	10/29/15	11/5/15
109			9/25/15	1 d	9/25/15	109							
110		UST System Install - 3 to 20,000 gallon Heating Oil and 1 to 15,000 Biodiesel	9/25/15	6d 4 h	9/25/15	110							
111		Install USTs, Piping, and Ancillary Gear - Manways, Containment, Vapor Systems, Controls, Etc.	9/25/15	4 d	9/27/15	112							
112		Inspections/Tests/Certifications	9/25/15	5 d	9/27/15	112							
113		Backfill and Compact	9/25/15	3 d	9/27/15	113							
114		Address	9/25/15	1 d	9/25/15	114							
115		Final Field Documentation	9/25/15	1 d	9/25/15	115							
116		Documents - UST Install, Operations/Monitoring	9/25/15	1 d	9/25/15	116							
117		Construction Completion	9/25/15	1 d	9/25/15	117							
118		UST Certification	9/25/15	1 d	9/25/15	118							
119		Genesee Removes Fueling Fleet to Property	9/25/15	1 d	9/25/15	119							
120			9/25/15	1 d	9/25/15	120							
121			9/25/15	36 d	7/26/16								
122		Site Closure and Documentation											
123		Quarry GW Monitoring Starts	9/25/15	0 d	9/25/15	123							
124		Quarry GW Monitoring	9/25/15	1 d	9/27/15	123							
125		Quarry GW Monitoring 2	9/27/15	1 d	9/27/15								
126		Quarry GW Monitoring 2	9/27/15	1 d	9/27/15								
127		PLA Review of Submittals	9/27/15	5 d	9/23/16	123							
128		Cleanup Action Completion Report	9/27/15	2 d	9/23/16	128							
129		Ecology Review - Cleanup Action Completion Report	9/27/15	10 d	9/27/16	128, 95							
130		Groundwater Monitoring Reports	9/27/15	4 d	9/27/16	123, 127, 11							
131		Ecology Review - GW Monitoring Reports	9/27/15	10 d	7/1/16	130, 95							
132		Final Documentation - Closure Completion	9/27/15	2 d	7/29/16	131							
133													
134													
135													
136		Charleston Station Construction											
137		Power Supply	9/25/15	6 d	9/27/15	108, 6							
138		Teleconnection	9/25/15	1 d	9/25/15	138							
139		Lighting	9/25/15	2 d	9/27/15	139							
140		Surface Prep/Drainage, PAVING	9/25/15	2 d	9/27/15	139							
141		Fencing	9/27/15	3 d	9/27/15	140							
142		Other 1	9/27/15	2 d	9/23/16	140							
143		Other 2	9/27/15	1 d	9/27/16	142							
144		Safety Checks and Trail Run	9/27/15	2 d	9/24/16	143							
145		GOVERNOR/PLA/Colony/Genesee - Ribbon Cutting!	9/25/15	0 d	9/24/16	143							
146		Charging Station - Open to Public!!!!	9/25/15	1 d	9/27/16	144							

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Genesee OI - UST Project with PLA MODS 9-25-15.mpp
9/25/15

Sharp's Automotive, Moxee

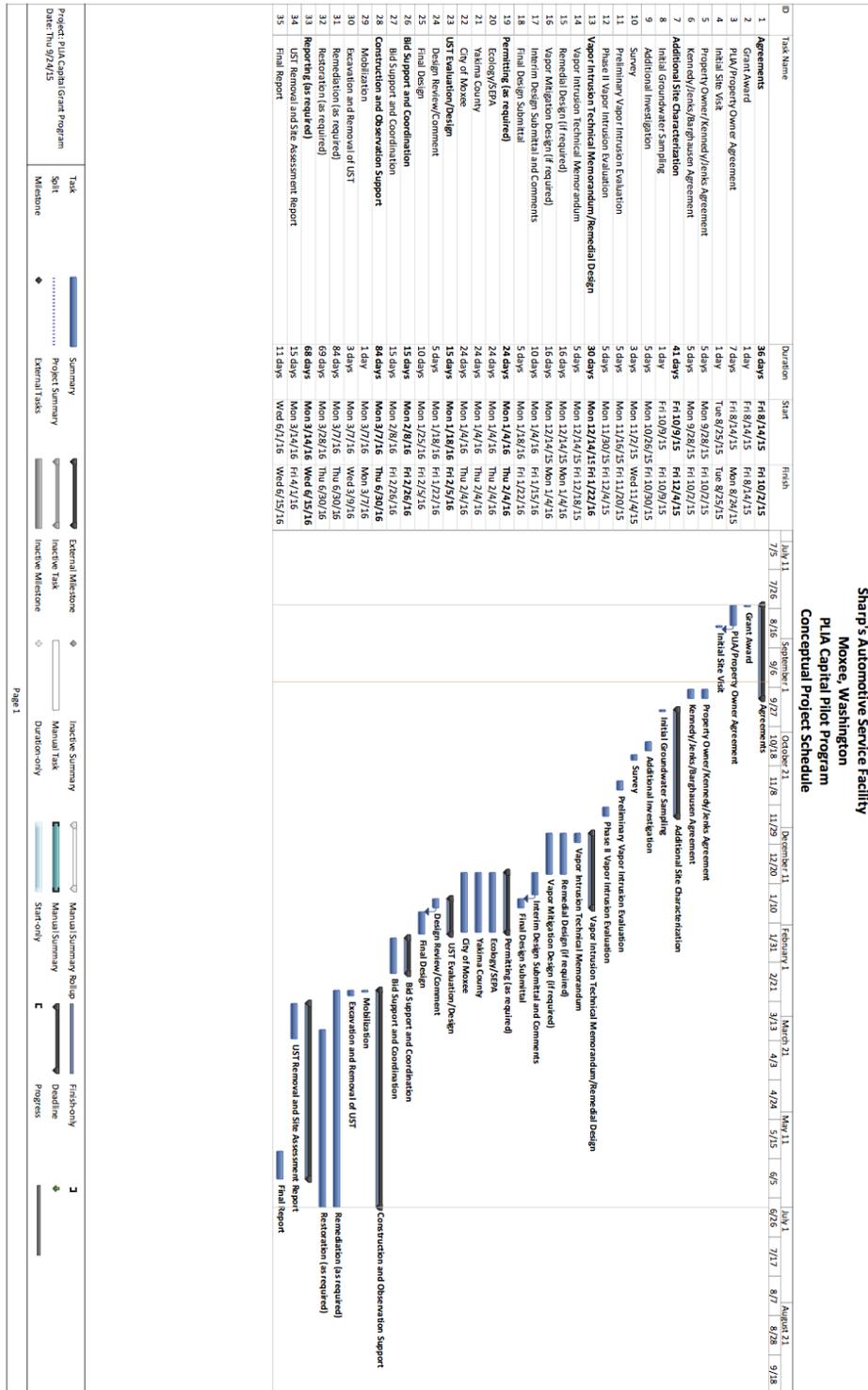
Size of award: Up to \$600,000 (funds to be disbursed at completion of project)

Background: In 1994, Sharp's Automotive was awarded a small grant from PLIA to cover costs associated with upgrading and replacing the underground storage tanks (USTs) at the operating gas station. In November 1994, during the UST excavation activities, soil and ground water contamination was discovered. A total of approximately 182 cubic yards of petroleum-contaminated soil was excavated from the property with petroleum contamination remaining in the soil and ground water. Ground water monitoring wells were installed on and off the property.

A loan application in 2013 was denied. In 2015, Sharp's Automotive was awarded a second grant from PLIA to remove and replace one aging tank, replace product piping line, remove historical petroleum contamination left in place from the 1994 tank upgrade, and to install a level 3 electric charging station.

A residential homeowner behind the gas station complained of smelling gas while digging a fence post. The environmental consultant chosen by the Sharp's has put together a vapor intrusion work plan to resolve this pathway. This site will be entered into the Department of Ecology, Central Regional Office, Voluntary Cleanup Program (VCP) through the Toxic Cleanup Program (TCP) for an approval of this vapor intrusion work plan. Once the site is entered into VCP, the Ecology site manager has up to 90 days to provide an opinion. After Ecology approves the vapor intrusion plan, a cleanup action plan will be developed and submitted.

Sharp's Automotive Project Timeline



Appendix C: PLIA Stakeholder Engagement

During the fact-finding process leading to this report, PLIA obtained ideas, comments, and feedback from the following organizations:

- Washington State Department of Ecology
 - Toxics Cleanup Program
 - Hazardous Waste & Toxics Reduction Program
- Washington State Department of Transportation (Tonia Buell)
- United States Environmental Protection Agency (National Office and Region 10)
- Washington Oil Marketers Association (Lea Wilson, Executive Director and Executive Board)
- Western States Petroleum Association (Frank Holmes Executive Director, Greg Hannon)
- Washington Environmental Council (Rod Brown)
- Puget Sound Energy (Bryan McConaughy)
- Underground Storage Tank Insurance Providers
- Association of State and Territorial Solid Waste Management Officials
- Environmental/Development Attorneys (Mike Dunning, Chuck Wolfe, Ken Lederman)
- Greenroads (Jeralee Anderson, Executive Director)
- Washington State Transportation Investment Board (Steve Gorcester, Executive Director)
- Department of Enterprise Services (Annette Meyer)
- Department of Commerce (Jane Swanson)
- Tacoma-Pierce County Health Department
- Multiple Credit Union Board Members and Community Development Financial Institution (Craft3)
- Multiple environmental consulting firms, UST and alternative energy suppliers

Source: PLIA

Appendix D: Acronyms Used in the Report

ASTSWMO	Association of State and Territorial Solid Waste Management Officials
CFR	Code of Federal Regulations
CWSRF	Clean Water State Revolving Fund
DOH	Washington Department of Health
DWSRF	Drinking Water State Revolving Fund
EPA	U.S. Environmental Protection Agency
EV	Electric vehicle
FR	Financial Responsibility requirements for USTs
FTE	Full Time Equivalent
LUST	Leaking underground storage tank
PLIA	Pollution Liability Insurance Agency
PPT	Petroleum Products Tax
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RLF	Revolving Loan Fund
UST	Underground storage tank
VOC	Volatile Organic Compound
WAC	Washington Administrative Code
WTP	Willingness to pay